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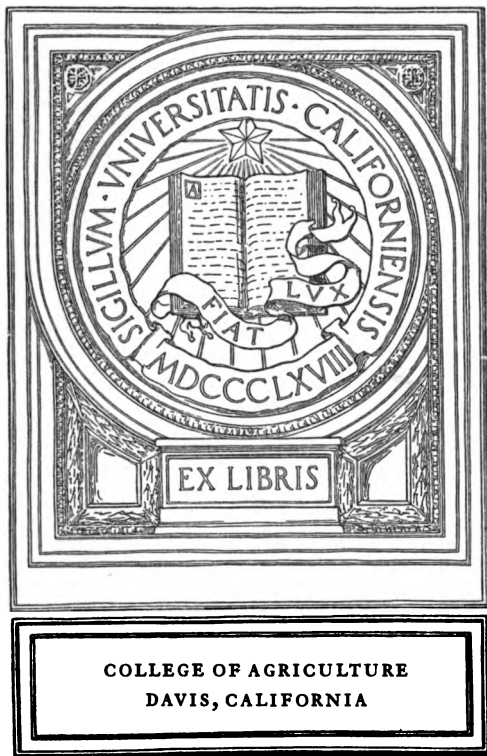
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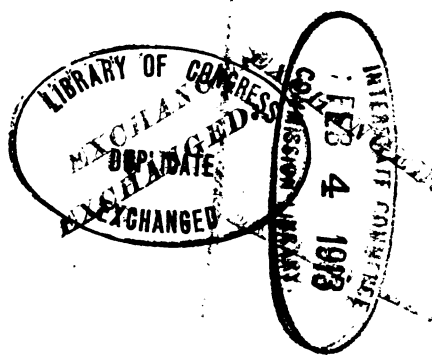


*Annual report of the secretary of
the State Horticultural Society of ...*

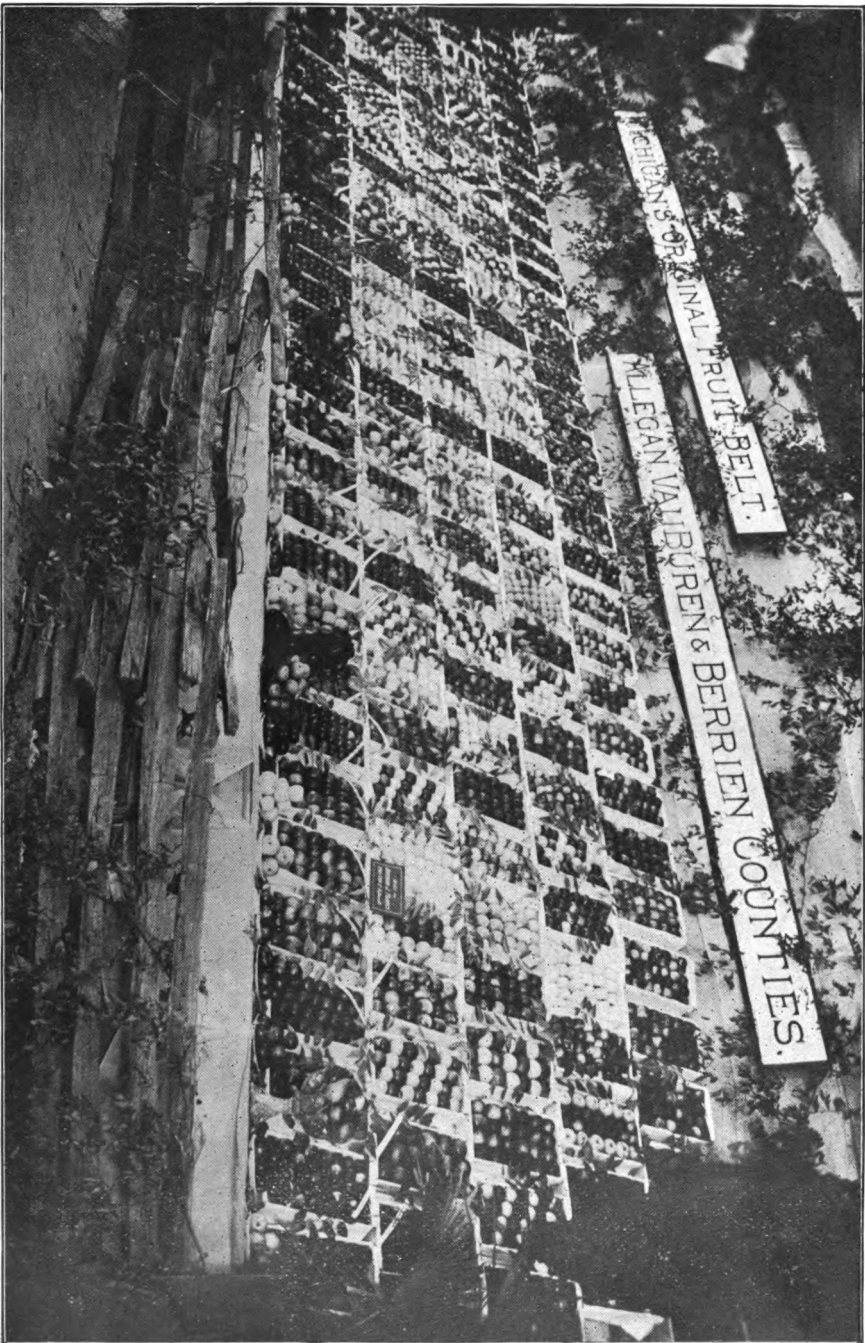
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An attractive fruit exhibit at Michigan's first Apple Show at Grand Rapids.

FORTY-FIRST ANNUAL REPORT

OF THE

SECRETARY

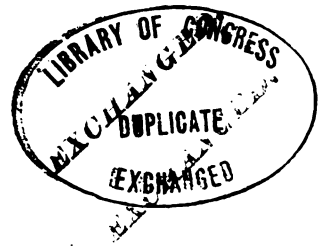
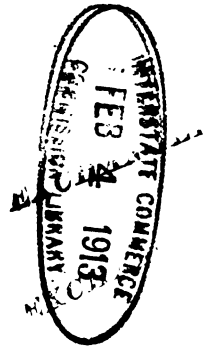
OF THE

STATE HORTICULTURAL SOCIETY

OF

MICHIGAN

FOR THE YEAR 1911



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REPORT OF THE SECRETARY OF THE MICHIGAN STATE
HORTICULTURAL SOCIETY.

FENNVILLE, MICHIGAN,
January 1, 1912.

TO HON. CHASE S. OSBORN, *Governor of the State of Michigan:*

I have the honor to submit herewith, in compliance with legal requirements, the accompanying report of 1911, with supplementary papers.

Respectfully yours,

CHARLES E. BASSETT,
Secretary Michigan State Horticultural Society.

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REPORT OF THE FORTY-FIRST ANNUAL MEETING OF THE
MICHIGAN STATE HORTICULTURAL SOCIETY,
LUDINGTON, MICH., DEC. 5-7, 1911.

President Farrand—The audience will please come to order. The hour has arrived for the opening of this meeting, and it will be so opened by an invocation.

INVOCATION.

O God, Thou art our Father. Thou art the Father of all things, and we would acknowledge Thee at the opening of this session. We would indeed acknowledge that Thou art the giver of every good thing that we enjoy. As we see so many tokens round about us of Thy favors to us, so many blessings that come to us through the natural world, we would recognize Thee even there. May we believe that Thou art the God who sends the sunshine and the rain, who gives us abundant crops, who gives us prosperity. O may we in return bring to Thee grateful hearts and lives of loyal obedience. We thank Thee, heavenly Father, for all the opportunities that come to us in this great day of privilege, the opportunities that Thou hast given us of associating with, and serving, each other. Give unto us a glimpse this morning of our Master, and the spirit of sacrifice which He brought to the world. And then, dear Lord, when we have served Thee here as long as Thy good pleasure shall grant us to remain, do Thou give us an abundant entrance into Thy better world above where we shall meet again with all the loved and redeemed of this world. In the name of Christ, our blessed Redeemer, we ask it. Amen.

President Farrand—We will now listen to an address of welcome by the mayor of Ludington.

Mr. President and Gentlemen of the Convention—By reason of my occupancy of the position of mayor of the city of Ludington it becomes my pleasant duty to welcome you all to our hospitality. I extend this welcome, gentlemen, not alone because it is customary to do so, but for the further reason that we sincerely feel that your coming is a matter of great profit and benefit to our county.

For twenty years past the fruit raising industry of our county has suffered from the prevalence of the codling moth, the curculio, the tree borer, the curled leaf and various other diseases and insect pests too numerous to mention in detail. For years we divided our fruit crops with these diseases and pests and were satisfied with only a half yield of poor fruit hardly worth calling fruit.

Through your work, gentlemen, we have learned to control these

hindrances and by pursuing a course of thinning the fruit upon our trees and giving them the humus and nitrogen furnished by cover crops, together with the intensive methods of culture which have been found necessary to produce good crops of any thing. We are now enabled to produce the best fruits and the largest yields of any section of the country in Michigan. For these reasons more than any other we feel greatly indebted to you gentlemen and desire to manifest our thanks by giving to you all the possible courtesies and hospitalities at our command.

In conclusion, gentlemen, rest assured that not only Ludington but Mason county welcomes you most heartily to our city, our only regret being that we shall not be able to give you as valuable aid in your vocations as we will doubtless receive from your deliberations.

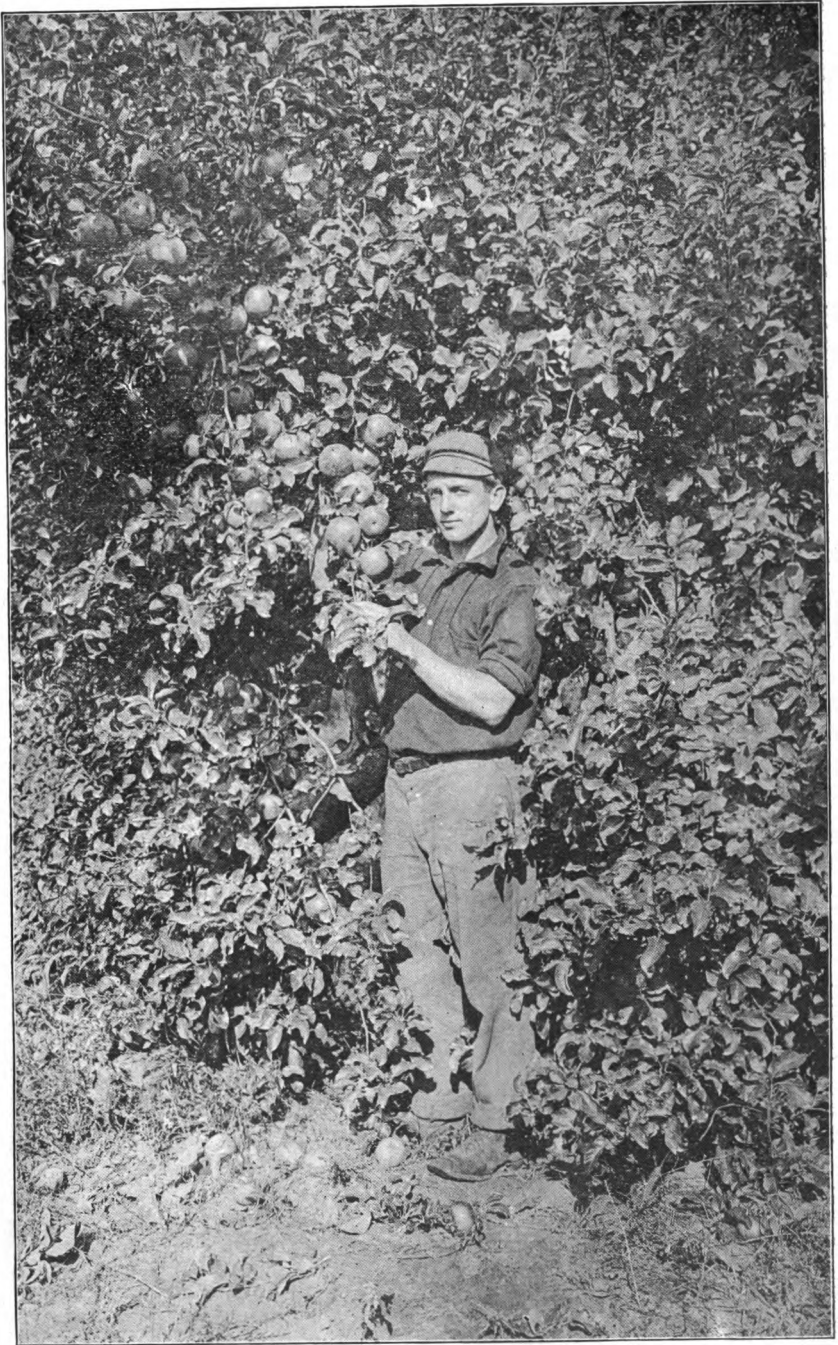
President Farrand—The first number on the program is "Thirty-five Years of Fruit Growing in Mason County," by Mr. Smith Hawley, of this city.

THIRTY-FIVE YEARS OF FRUIT GROWING IN MASON COUNTY.

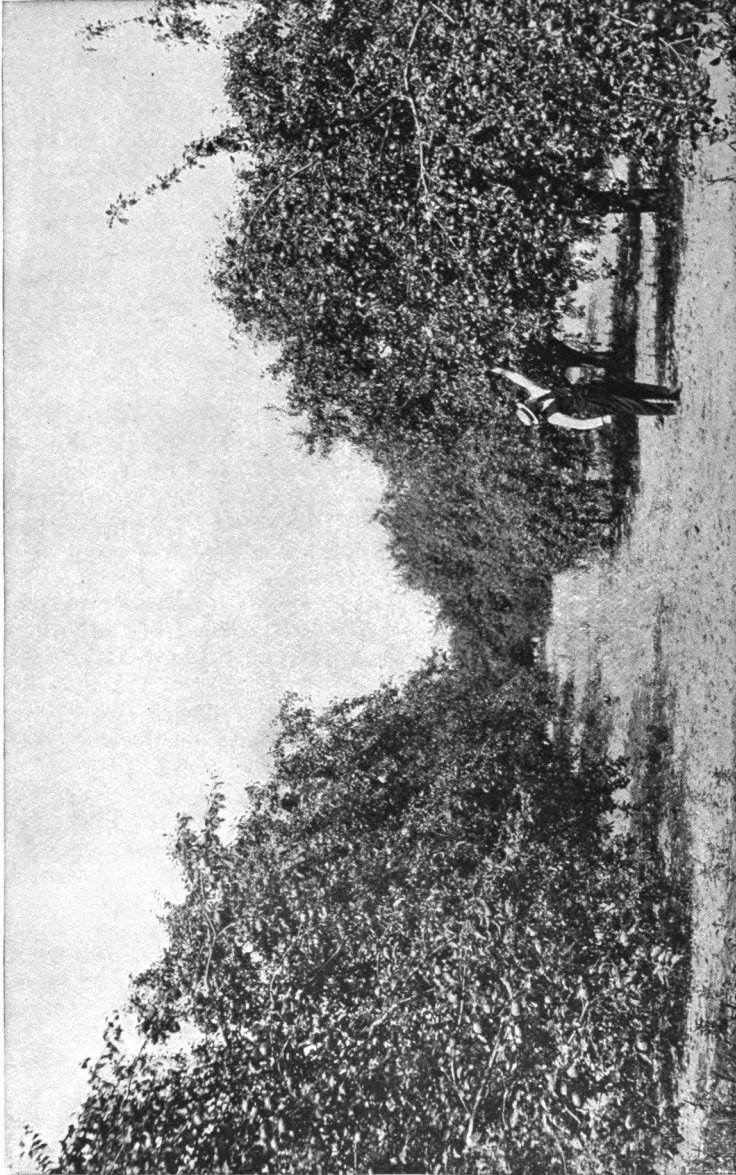
SMITH HAWLEY, LUDINGTON, MICH.

Before I take up the topic assigned me, I would like to say a few words to the good people of Ludington and Mason county, especially the fruit growers, and I would like that outsiders close their ears to all that I am going to say. It is this: I wish to say, as president of the Mason County Horticultural Society, that it is expected that every fruit grower in the county who is present here at this meeting will extend to our visiting delegates every courtesy and every favor in their power. Show them that we know what true hospitality is. Extend to them the right hand of fellowship. I know that farmers are generally diffident about forcing themselves ahead in such matters as this, but we must forget ourselves in this respect. Become acquainted with our visitors and show them that we really appreciate this meeting that has been brought here.

Mr. Chairman—This period of time covers practically all of the time that has any relation to fruit growing in this county, for up to a period beginning thirty-five years ago there was no fruit grown in this county except in a very few scattering apple orchards planted by the early settlers. My own first apple orchard was set just thirty-five years ago and is now just in its prime and good for at least thirty-five years more. Other settlers on new lands at about the same time began setting out orchards, but we nearly all made the same mistake—we set our orchards solely with the view of supplying home needs and of having a few to sell in the local market—and, as a consequence of this idea of the possibilities of an orchard we set too many varieties, as we at that time knew nothing about shipping fruits to other markets. Of course, we had no thought of a commercial orchard, nor took a thought as to what to set that would sell best in other markets. This plan of setting too



G. M. Low of Bangor, Van Buren County, and some of his famous Northern Spy trees.



Ninety per cent of these Apples Graded Number One. Smith Hawley, Mason County.

Courtesy of the West Michigan Development Bureau.

many varieties works against the grower from the fact that buyers prefer large lots of a few varieties rather than small lots of many varieties. And yet after my experience I should not advise any one to confine himself to three or four varieties, for you are likely to have full crops one year and none the next. In the meantime while waiting for my apples to begin bearing I had set out in the spring of 1879 my first peach orchard, covering a whole acre, 160 trees. Well, I thought I was surely "spreading" myself. I had the largest budded peach orchard in the county and was severely criticized for my lack of judgment in setting out budded fruit so far north, and it was confidently predicted that they would be frozen to death the first winter, and I watched both the weather and my trees very anxiously that first winter. But it has always been my way to try out things for myself and I was doing so with this orchard, and when the warm breath of spring started the sap to flowing those trees started out with a vigor that put my critics to shame. And how they did grow in that virgin soil. Every week I could note the increase in size until by fall they had made from three to five feet in growth and I began myself to fear they would winter-kill because of their phenomenal growth, but it has been my experience that strong, vigorous trees will stand the winters better than weak, slow growing ones, because of their greater vitality. Other men had begun to set peach trees now, mostly on the rolling, hilly lands, and all thrived wonderfully, as the soil was mostly new and rich in nitrogen. But we all made another mistake here as we were beginners, we did not head them back and when they were seven or eight years old we could not reach the tops with a ten-foot ladder. The year my first acre was four years old I sold \$250 worth of peaches from it, handling them in the old fashioned round baskets, which resembled the women's hats of the present day in shape, inverted. Then began the rush to set peach orchards and it has increased steadily up to the present time. And now upon a thousand hills and slopes in this fair county where less than half a century ago the forest primeval held undisputed sway, and where deer and other wild animals roamed at will, are seen the handiwork of the enterprising husbandman in the shape of flourishing orchards of apples, peaches, cherries, plums and other fruits. And other thousands are waiting and inviting enterprising men to come to this land of promise, and where not only promises are given but where fulfillment of those promises is soon realized, and where fortune awaits the horticulturist who will give his business the same care and study and efficiency that is required of the business or professional man in these days of high living if he expects to make a success. And let no man think he can be a success at fruit growing by the slipshod methods of a quarter century ago. We must become specialists in our line, seizing every opportunity to gain and apply all the knowledge we can bearing in any way upon our business, being assured that the more we can put into our business in the way of scientific methods the greater will be our reward.

In the meantime I had increased my peach orchard by 800 trees, but was unfortunate in these, as were many others, a very large proportion of my trees being untrue to name, and in my case at least, most of those substituted being wholly worthless varieties and I lost many hundreds of dollars by this, as peaches brought good prices in those days. And we have the same difficulty to contend with at the present day. Nursery-

men whom I have dealt with for years with entire satisfaction have "fell down" at last and given me a deal that would make the angels weep. We now began, about 1890, to be troubled with the disease known as curl leaf and lost largely by it, but in 1894 I began spraying for it under the direction of Prof. Newton B. Pierce, government pathologist, stationed at Santa Ana, Cal. I was thus the first man to use the spray pump in this county. The results were so entirely successful that I have never omitted spraying since. The following year I began spraying my apple orchard with results even more gratifying than with the peaches. All my early knowledge of apple spraying I owe to Prof. Taft, who was experimenting at that time and whose experiments were printed in the college bulletins. Of course, I have continued spraying since and have always found that the better I did the work the better the results and that I only got good fruit but that I have conserved the life and health of my trees. Spraying is now recognized as a necessity by all progressive fruit growers. There are a few, however, who balk at the expense and trust to "luck" for a crop, but luck cuts a mighty small figure in fruit growing. It has instead become almost an exact science and I find that the successful fruit grower of the future must become a specialist. And this applies not only to the art of producing good fruit but also to the proper methods of handling and marketing his product. Different markets require different packages, especially so with peaches and the shrewd grower will cater to the requirements of his market. But no market I find has any call for cull fruit and the successful fruit grower of the future must quit growing that kind, or if he does happen to have some that is poor he would better feed it to the hogs than to market it.

The abundant crops of fruit and the good prices we have obtained for it for the last few years in this county have given such an impetus to the fruit industry that at the present rate of tree planting we will soon be in the front rank among the fruit growing counties of the State, and it will soon become all important that we grow and market nothing but the best for there is no money in growing and marketing any but the best. Packages, freight and other expenses are just as great for culls as for the best, and it is always owing to an over supply of poor fruit that the markets go broke. Of course, we have had our "bumps" and discouragements along the way during all these years, for it has not been all smooth sailing with us, just the same as others have experienced in other places. But most of our troubles have come from the selling end of the business. We have tried various methods of disposing of our fruit, selling more or less to local buyers, but the greater part of it being mostly consigned to commission houses in Chicago and Milwaukee, and while this is an easy and convenient way to get rid of our fruit, it has too often happened that all we did was to get rid of our fruit, as there were many times when there was nothing left for the grower. They have even sent us bills for the freight; solicitors from other points have occasionally visited us and in a couple of instances succeeded in getting four or five cars of fruit and then skipping out, leaving the grower in the lurch. But most of these scoundrels have been exposed and I guess it would be a hard matter now for a stranger to get fruit without paying for it. While the majority of the commission merchants today are probably as square dealing as the average business man, there was a

time, not so very long ago either, when the majority were swindlers. We also tried the co-operative plan with some success for a time, but that finally ceased from various causes and we are now just about where we started and any hints or suggestions regarding this very important part of our business will be gratefully received.

DISCUSSION.

President Farrand—Now, gentlemen, you have heard an interesting paper, and the way to get any benefit out of a meeting of this kind is by every one taking part; coming here with a definite purpose of telling your experience and getting the other man to tell his. Thirty-five years of experience means something. Those who are just starting in new at the business have many things to learn, run up against many problems difficult of solution, so when you have such a good opportunity, do not fail to take advantage of the suggestions, advice and instruction that Mr. Hawley can give. Mr. Hawley will be pleased to answer anything concerning his work.

Mr. Smeltzer—One thing Mr. Hawley said in his address that Mason county led any other county in quality of fruit. I have looked their fruit exhibit over and must acknowledge that it is fine, but there are other counties in Michigan that produce fruit, and such statements, which are sometimes made by agents gives room for argument. There is a little matter I wish to refer to here, however, and it was said to me in this city yesterday, that farmers were not as bright as other men, or men in some other business, and this idea prevails in many sections, but I am sure that if the gentleman who made this sneering remark could have heard this paper read he would have changed his opinion.

I would like to ask one question, Mr. Hawley. If you were going to plant an orchard of say seventy-five to one hundred acres, with suitable soil, etc., what variety of apple would you plant for a commercial orchard? In other words, what would be your judgment as to investing in an orchard of this size, and what varieties would you put in it?

Mr. Hawley—First, I want to say that it is a poor stick of a man who won't boost for his own county. I like to stand up for my own, and we should all do this, but of course, we must have something to stand up for. We have that here in Mason county.

But to the question: If I were a young man, just starting, I should put out an apple orchard just as quickly as possible. As to the varieties, that is a hard question to answer. Much depends upon the location, the requirements of the markets, etc., but there are certain varieties for which there is a demand, no matter where the market, and they always command the best prices. The Jonathan, for instance, is a good selling apple. I sold my Jonathans for \$5.50 per barrel on the Chicago market, but of course they were apples. How did I do that? By first making a reputation, and don't forget that your reputation is just what your fruit is. I have shipped to the same house for six or seven years. Then, I have always tried to keep my eyes open to learn from others. I gathered many valuable ideas from the packers sent to pack the fruit in orchards I sold to buyers, and I have got to where the report on my shipments is that the pack is perfect. Well, as I was saying, the Chicago market especially demands Jonathans and it also demands the Grimes' Golden.

These produce well in northern Michigan. Then the Northern Spy and the Rhode Island Greenings. This latter is one of the best sellers, and are counted as good as gold. I would not plant very many Baldwins, if any.

Mr. Farrand—I would like to have Mr. Hawley give his opinion of the McIntosh Red.

Mr. Hawley—I do not know anything about the McIntosh Red.

A Member—How about the Northern Spy?

Mr. Hawley—All right.

A Member—How about the Hubbardston?

Mr. Hawley—That is all right—it is among the best.

A Member—Is not the Hubbardston quite likely to wilt?

Mr. Hawley—Not if packed early and properly. There are so many points that we must learn. The Hubbardston is liable to wilt if it is not put in cold storage at once after picking. It ripens early. There is a point about the Spy that I wish to mention, it will not bear until fifteen or twenty years old. In my own case I have taken the bull by the horns and made them bear. How? Well, my son about a year ago read an article from a western man who said that out there where he lived, if the trees did not bear, they girdled them, and then they bore. I girdled a tree, one that did not seem to want to bear—just took out a ribbon with my knife, and that tree this year blossomed full, and was full of fruit. The other trees did not even have a blossom on them. The girdled part grew up all right and now you can hardly see where it was. I want to girdle thirty or forty more trees. I want them to bear, and if they do not then I will pull them out, for I will not have an unfruitful tree on my place.

A Member—What time of year would you do this girdling?

Mr. Hawley—Last year I girdled about the 12th of June. It was a late season. This year I think I made a mistake—I girdled on the same date, but the season, as you know, was advanced about two weeks over what it was the year before, so that made a difference. I should have girdled them some ten days earlier. I think I will lose one tree, but of course we learn by experience.

A Member—How wide a strip did you take?

Mr. Hawley—Last year I took three-eighths of an inch; this year one-fourth of an inch. I had an idea that it would be better to leave a little, say half an inch, so that the sap will flow better and it heal up quicker. Now, I don't want you to think that I am advising you to girdle your trees. If you do it, you do it at your own risk. I don't want any of you to say that that old man Hawley has made you kill your trees.

A Member—What about fall apples?

Mr. Hawley—If you want a fall apple set the Wealthy, Maiden Blush, but do not set the Duchess. I have made more money out of my Maiden Blush than any variety in my orchard. They have never missed bearing for twenty-five years, and the Maiden Blush has a reputation that will sell it. They never over-bear. You can thin the Wealthy heavily, and if you thin properly and thoroughly when your trees are young, anything under twenty years, you can make your trees bear every year. Then the Wagner is a good apple, and I have made that bear every year, but they are a rather short lived apple tree. However, they are such a good tree to bear while they do live that they are profitable.

A Member—Taking the different varieties, such as the Northern Spy, Rhode Island Greening and Grimes Golden, how thin would you make these on the tree?

Mr. Hawley—That would depend on circumstances. You must go according to the varieties. The Greening will bear the whole length of the limb, so also the Baldwin. Then again, it will depend on how you have trimmed your trees. If you have lots of branches, you must have them six or eight inches apart. My Greenings this year dropped so heavily that I was mourning. I told my son that we would not have a quarter of a crop—in fact, I did not think we would have five bushels to the tree, but when they began to grow, I actually had to thin, and we had the best crop of Greenings we ever had, and there did not seem to be hardly any on the trees at first. If you have them a foot apart, it is not too far apart.

A Member—I notice in the exhibit over across the road that you have a good many Kings, but you haven't said anything about Kings.

Mr. Hawley—The King is a poor bearer. It is a good apple, however, if you can make it bear. Possibly this can be done by girdling. The only objection to them is that they are shy bearers. They are like the Canada Red.

A Member—Do you usually wait until the June drop before you thin?

Mr. Hawley—Yes.

A Member—What is the effect of this girdling on the growth of the tree?

Mr. Hawley—Very little.

A Member—I would like to inquire if summer pruning would not have the same effect?

Mr. Hawley—No, I have practiced summer pruning for years. It does help to some extent, but not what is desired.

Mr. Olmstead—You said that some criticism was made with regard to the grading of apples, that they were so poor that they would make a pig squeal. Then later in connection with the same thought, the gentleman said that he took these apples and fed them to his pigs. I would like to inquire if he is not by so doing laying himself liable to the law for cruelty to animals? (Laughter.)

A Member—Regarding the question of girdling, I started that thirty-five years ago when I was a small boy. I had heard it said that girdling would make a tree yield. Father had an old Baldwin tree that failed to bear as it should, and we girdled it. The next year that was full of fruit, but that is the last year that it bore. Now I believe from my experience, and I have all my life been in the orchard business, there is a better way than to girdle. Cultivate your orchard in the spring and then check the growth by stopping cultivation, and in this way I believe better results and surer, and without injury to the tree, can be secured than by girdling.

A Member—Have you ever used Spy scions on healthy stock?

Mr. Hawley—I have never tried it.

Mr. Morrell—May I add to what Mr. Hawley has said two things in regard to the McIntosh Red in Michigan? It is one of the most promising apples you have. It is an enlarged Snow, as high or higher quality than the Snow, and sells readily in the Chicago market at from \$5 to \$6 per barrel. The other point is in regard to thinning apples. A

thinned tree is less labor than one not thinned. The expense of thinning is more than saved in the final cost of picking. If you leave them, on you of course will get twice as many apples, but it takes twice as long to do the work, and then there is the sorting. Eleven years ago I commenced thinning apples, and I did so at a cost of from 25 cents to \$1.50 per tree, and took alternate trees through the row. I had the same success as Mr. Hawley, and found that when the expense was taken into consideration, it was less when I thinned, so it worked two ways, it was more profitable as regards the labor involved, and I got better fruit.

A Member—I would like to know if the McIntosh is not an earlier ripening apple than the Snow?

Mr. Hawley—Yes, it is.

A Member—I am not so sure about the ripening, but I do know that it is a magnificent table apple, and its orchard qualities are excellent.

A Member—Why do you exclude the Baldwin?

Mr. Hawley—For two or three reasons. It is not a sure bearer in this country, and it is also very subject to bitter rot. It does not command the price on the market that the Greening does, or the King or the Spy, the McIntosh or the Grimes Golden.

A Member—I would like to have Mr. Hawley explain his method of packing.

President Farrand—That is a good question, and one that should have more time than we give to it under this topic, and we will hold it over until we have more time. If there is nothing further on this subject we will now take up the next one on the program, which is "New Varieties for Michigan," by F. A. Wilken, of the South Haven Experiment Station. He is too well known to you to need any formal introduction.

NEW VARIETIES FOR MICHIGAN.

F. A. WILKEN, SOUTH HAVEN EXPERIMENT STATION.

Mr. Chairman, Friends—The question of varieties of fruit has its counterpart in the human family. Of the multitude who have lived only a few make successes, so with the varieties, of the thousands existing only a few rise above the horizon of the common. Many are not even heard of.

Under the heading of this topic it is my duty to mention a few of the newer successes that I have become acquainted with.

When it comes to setting a fruit plantation the question of varieties is generally the hardest to solve even for experienced men. Everyone naturally wants those varieties that will do best in their particular location. So I would advise caution in the extensive setting of new varieties even though highly recommended. It is also highly important to learn under what conditions various standard varieties do the best. For instance, if the Jonathan almost reaches perfection in one locality it is not essentially so that it do so in yours. The Keiffer has its friends and enemies, probably more enemies than friends. However, I know of some locations where the Keiffer grows into a very respectable pear.

In one instance I know of, it is one of the most profitable varieties on a place where the highest class fruit is a specialty. As an illustration of the kind of fruit this grower grows and the kind of market he has it might be stated that he got \$3 a bushel for his fancy Jonathans. Varieties vary greatly under various conditions and a systematic investigation of the behavior of varieties under various conditions of soil, climate, general lay of the land, care, etc., by some large public institution would be of great value to the fruit growers of this country.

The strawberry is especially susceptible to changes, especially of soil and moisture as it is a shallow rooted plant. For this reason I will not mention varieties of strawberries at all, for what may do well on your place would probably be a failure on your neighbors or even on another part of your place. In general, however, the large leafed varieties that are rather shy in making plants and have berries of high quality such as the Marshall, Wm. Belt and Gandy need a rich, dark, loamy soil. Large leafed varieties that are moderate plant makers and have berries of rather poor quality such as the Clyde, Bederwood and Uncle Jim do well on lighter soils. Varieties of medium size leaves and being good plant makers and good bearers such as the Dunlap, Warfield and Buster do well on a larger range of soil than other varieties. The Buster is a new variety and is a very good one for this type of berry. For several years it outbore any variety in our patch. Every strawberry grower should have a trial patch where he can try such varieties as look good to him in the catalog after due allowance has been made for the coloring matter put in the descriptions. It is well to go slow on boomers.

There has not been many varieties of gooseberries and currants introduced in the past few years. There is, however, one variety of gooseberry and one of currant that I can safely recommend. The Portage is an American seedling of an English gooseberry. It is a moderate grower, not quite as good as the Downing, but almost as good a bearer. It is a large, handsome berry and is better than any English variety we grow. It is almost entirely free from mildew. All who want to grow a fancy gooseberry should give this variety a trial.

The new currant is the Perfection. It is a vigorous and prolific variety that bears large, handsome fruit of the cherry type. The bunches are quite long and compact and are well filled out at the ends.

The Austin dewberry which has been exploited around by agents under the name of Texas and sold at fancy prices is quite promising. It is a rampant grower and bears well of large fruit of good quality. The texture of the berry is a little soft but it is well shaped and of good color. It is a few days earlier than the Premo. I believe that it would be somewhat tender for the northern parts of the State.

We have found nothing in the black raspberry line to beat the Cumberland. As an early berry the Eureka will probably take the place of the Kansas. The Kansas has the habit of having off years when the berries are very nubby and small. Eureka is fully equal to the Kansas in every way and does not have off years. Eureka and Cumberland would make a good combination to fill out the blackcap season.

There is only one red raspberry in my estimation and that is the Cuthbert. Some, however, like the King and others the Miller. I have seen the King do very well on clayey soil but on our sandy loam it is

a failure. No new varieties have shown up unless it be the Eaton for home and local market uses. It is a very large berry that crumbles easily and gets red long before it is ripe. It would fool many who do not know this. It ripens fruit through almost the entire red raspberry season, starting with the early ones and still ripening berries with the late ones. Not being firm it will not do for general market purposes.

In the blackberry line there are several new varieties of promise. Rathbun has probably proved most promising of all. It resembles Wilson in appearance and season of ripening. It is a good grower and is very productive, many years bearing more than any other variety. It is better than the Wilson in that it is more hardy and does not need covering during the winter, at least in the southern part of the State. It should take the place of that variety. Other new varieties, Mersereau, Blowers and Ward are all medium to late kinds. Blowers and Mersereau are both very hardy and bear well of large, handsome fruit. For the southern parts of the State the Ward is better than either of the above mentioned varieties as the fruit is of better quality and size.

The Himalaya blackberry has received some advertising in the last few years. It is a variety grown by Luther Burbank from some seed sent him by a friend from the Himalaya mountains. It is a very rampant and coarse grower, outgrowing anything I know of in blackberry line. The growth is very spreading and for cultural purposes it would have to be grown on trellises. The fruit ripens very late and is small and ill shaped. It is of poor quality and has a hard core. It is very hardy and may grow where no other variety will. Only in such places should it receive any consideration.

We have tried out nothing new in cherries that is of any value. I would prefer Montmorency to any other sour kind. Windsor, Napoleon and Schmidt's Bigarreau for sweet kinds, and Olivet and Montruel for dukes.

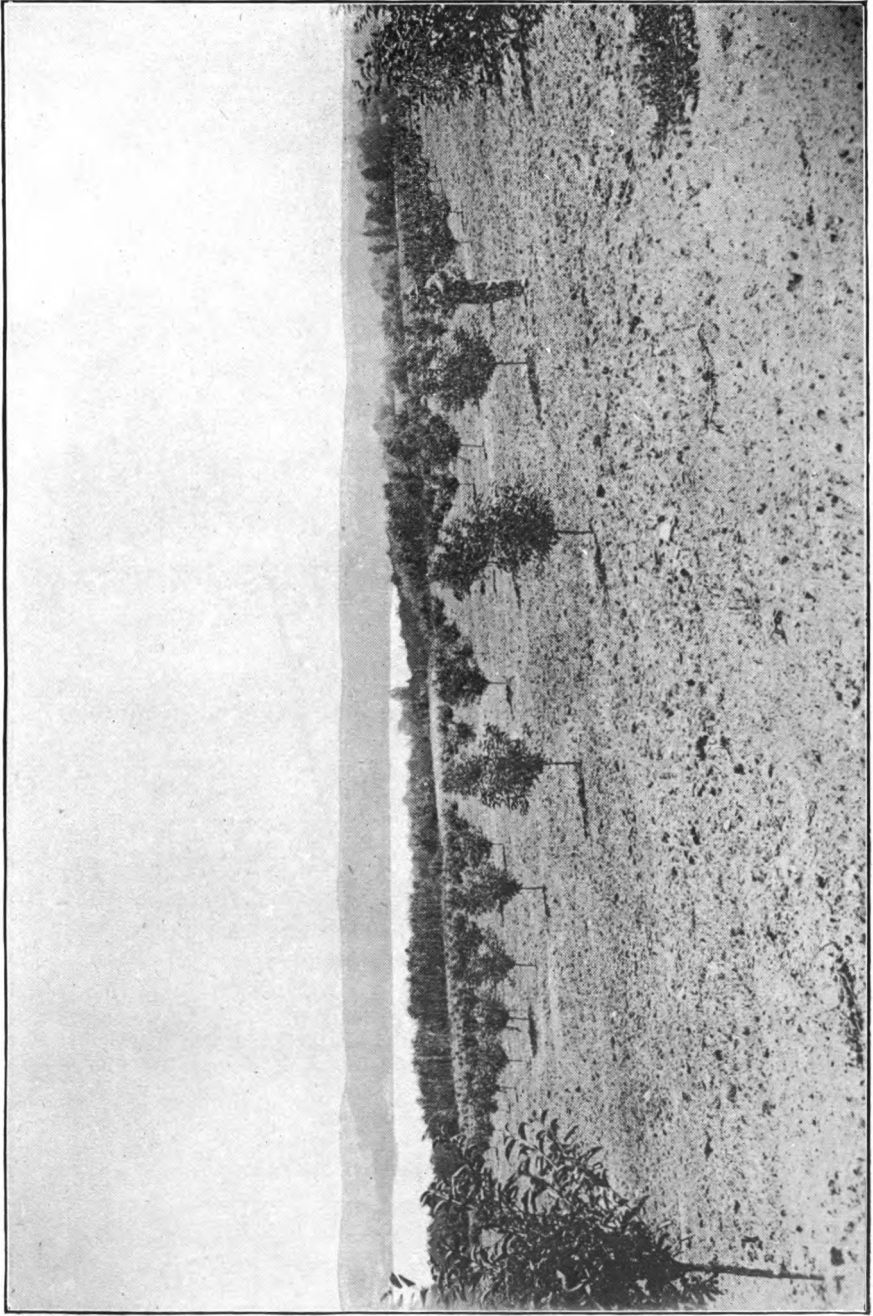
Nothing new in plums has developed recently. Monarch and Shropshire Damson are my favorites for commercial purposes. Coe's Golden should receive more consideration from those wishing a yellow kind.

The '06 freeze set us back in testing out new varieties of peaches. Already we find New Prolific in the standard list and Banner gaining prominence. Gold Mine is a favorite of many. Of the newer kinds that started bearing for the first time this year with us the Mayflower looked most promising. It is a very early variety, ripening about the middle of July. It is a large, well colored fruit, and it is likely to take a place in the list of early varieties.

We have nothing new in pears except Garber and LeConte. These are both relatives of the Keiffer and will probably not gain much prominence as the Keiffer will satisfy all of its friends. Both are better looking fruits but are not as productive and productiveness is the best feature of the Keiffer.

There are a few new varieties of apples that are worthy of consideration. Akin is a bright red apple of medium size that is not good eating until after the holidays and then it is fine. The tree is thrifty and is productive biennially. It is a good variety for fancy dessert trade.

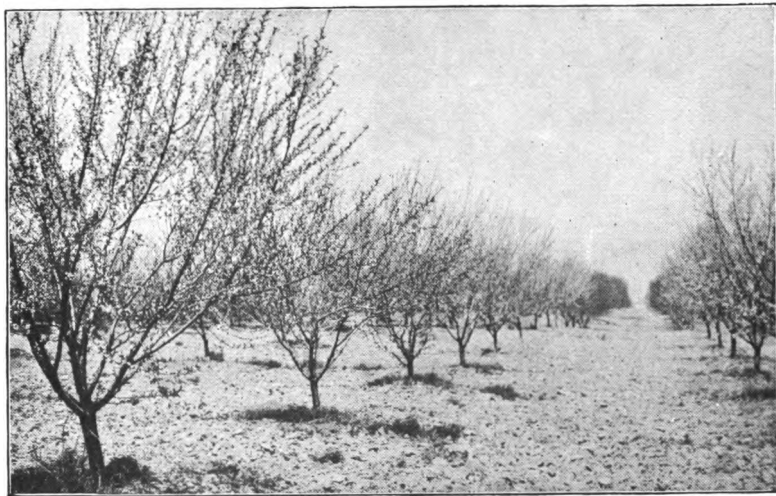
Dudley is a good fall variety, ripening about the first of September. It is a hardy, productive variety with large, striped fruit. It is a seedling of the Duchess. It is larger and later than the Duchess and not



Two-year-old Cherry Orchard at "Eveline Orchards," near East Jordan, Charlevoix County, in which Prof. L. R. Taft is personally interested.



**"Outlook Farm Home," Arlington Township, Van Buren County, Home of
Louis A. and Anna H. Bregger.**



**Three-year-old Peach Orchard on "Outlook Farm" of Mr. and Mrs. Louis A.
Bregger, Van Baren County,**

quite as well colored. While of little value in the southern part of the State on account of its season, I believe that it would be a good variety in the north where it would be an early winter variety and where hardiness is desired.

Fameuse Eucre or sweet snow is a very rich, handsome, medium sized apple of a dark glossy red color. It belongs to the Snow family and has the characteristic white flesh of the Snow. The contrast between the dark glossy skin and the white flesh is beautiful when the apple is bitten into. The flavor is an excellent sweet, Snow flavor and is better than the Snow. It bears about as well as the Snow and is about the same size. It is not as good a keeper but in cold storage it will keep well through the winter. I know of no apple that would make as good an Xmas apple as this variety.

While Mother is not exactly a new variety I think it is one that should receive more attention than it does. In these days when there is a demand for high class dessert apples we should encourage the planting of such kinds. The Mother is one of these kinds and therefore this special mention. The fruit is large, of good red color and fine flavor. The apple is built a little on the Bellflower plan. The flavor is fine. It ripens in September and will keep until March in storage. The tree is a moderate grower and a good bearer. It is like the King in tenderness and cankering and should be worked on some hardy stock such as the Spy to do the best.

I am a great friend of the Winter Banana as a variety for Michigan. We have thought of it as only a variety suitable for the west, probably because it was a fancy variety, one suitable for boxing only. There are many people who think that Michigan should confine itself to what they call the distinctive Michigan package, the barrel. They seem to think that we should not try fancy box packing, as if our fruit was not good enough and we were not capable to learn to pack boxes. I disagree right at the start with any such thought. As long as we can grow fancy box varieties as good as the west, which I know we can, why should we not pack them in boxes? The packing in boxes or barrels should not be determined by districts but rather by varieties and perfection of fruit. It would not be policy to pack Greenings, Baldwins, Ben Davis, etc., in boxes, even if perfect. The increasing demand for fruit to eat out of hand has probably been due to the more extensive setting of dessert varieties and more perfect fruit. In the past so many of the old standard varieties were not sufficiently enticing in flavor for eating or if they were the apples were not presentable because a big share of the apple would have to be cut away on account of scab and worms. The remainder was hidden under a pie crust. We are getting the King apple so now that we need not be afraid to take him out from under cover and are proud to put him on the table clothed in nothing but his natural skin.

Another reason the Winter Banana has not been advised in this State is because we did not know of the use of lime-sulphur as a summer fungicide until a few years ago. It is a variety that needs lime-sulphur to bring it to its best. There is much difference in the color and brightness of the fruit since using it. Now in color and size we can equal the west and surpass them in flavor. The western people complain of the Banana's tendency to bruise easily. When the variety is picked here

it is quite hard and with a little more than ordinary care it can be picked without bruising. The tree is of moderate size, bears well and young. The fruit keeps well. Let us push such varieties as Jonathan, Grimes, McIntosh and Winter Banana, Red Canada, etc., in places where they do well instead of the old standards as Baldwin, Greenings, etc., and box packing for such varieties instead of barrels. We will always have enough of barrel quality fruit to supply the demand for such.

DISCUSSION.

President Farrand—We can profitably spend some more time on the subject of apples, and if any of you have any questions to ask in reference to other varieties now is the time.

A Member—What about the Ontario?

Mr. Wilken—We have the Ontario. It is a cross between the Wagner and Spy. It is quite a promising variety but it lacks color. There are other varieties that I would rather have than the Ontario.

A Member—It is an earlier bearer?

Mr. Wilken—Yes, but not so early as the Wagner.

A Member—What about the Rome Beauty?

Mr. Wilken—We do not have the Rome Beauty. I do not think that there are any Rome Beauties grown in this State.

A Member—What about the Gravenstein?

Mr. Wilken—It is a good variety, but does not bear well. We have had some people visit the station who were almost tickled to death to find that we had that variety growing there.

A Member—What about the Winter Banana?

Mr. Wilken—Some think that this is in the same class with the Ben Davis and some other kinds of that character. There are two distinct winter varieties—one looks like the Maiden Blush in shape and color, and you might call it a winter Maiden Blush. The one we have is quite a little longer and more conical in shape. It has a distinct rib on the side. As it is grown at the station it is a fine apple.

A Member—Regarding the varieties as box apples, a gentleman here in the room says that he saw his Northern Spies sold in Chicago for \$10.50 a barrel. I think a variety that would sell that way don't need to be boxed. I would like to hear a word on that subject.

President Farrand—That is a question that will come up for discussion later on.

Mr. Wilken—Just a word on that. The Spy is a pretty big apple for packing. The apples that the packers are looking for mostly for box packing are those of medium size.

President Farrand—There is that Question No. 17, "What varieties of peaches are most profitable for this section? Are we setting out too many Elbertas?" Who can answer that?

Mr. Price—We are not setting too many Elbertas.

Mr. Hawley—The Elberta is all right. There are some other varieties, however, that are thought to be more profitable.

President Farrand—We have with us here several large peach growers and we would like to hear from them.

Mr. Morrell—I have a good many peach trees, something over a thousand acres, and about 75 to 80 per cent of them are Elbertas. I would

not object to varieties, but I like to do business in carload lots, and the buyers would find me away down in Texas, and wherever I grew them, and they always appear the first day the Elbertas are ready to ship and they disappear the last day you load a car of Elbertas.

A Member—What about the Chairs Choice?

Mr. Morrell—It is a poor substitute for the Elberta.

A Member—What about the Salaway?

Answer—It is too late for this country.

A Member—I want to say a word about the Elberta peach. I have had considerable experience raising them and my experience is that when you have a good quality of them the buyers will be right on hand as long as the Elbertas last, and you never see them the next day after they are gone. While we have peaches that are far better, in some respects, there are none that are so good for commercial purposes. If we planted more of them we would be better off.

A Member—How is the Stearns?

President Farrand—It is new to me—I could not say.

Mr. Morrell—I would like to inquire if any have had any experience with the seedling varieties of the Elbertas—whether some are earlier and some later?

Answer—We have had some experience, but the trees we have are young and as yet have hardly bore anything. This is really the first year that they have borne any, and it is difficult to tell from one year's bearing. I do not think they will amount to much.

Mr. Morrell—There are many of them bearing in Texas and some are good. The Elberta is producing some good seedlings with variations in time of ripening that really helps the Elberta out. One of these is called the Augbert, first called August Elberta, which means thirty days later than the Elberta. They are a perfect Elberta, only thirty days late. The tree is a stronger grower and just as sturdy. I had a half bushel shipped in an open basket to Benton Harbor three or four years ago. They were seven days on the road, and were shipped in August. I kept them there another week, making fourteen days from picking, and then some went to Grand Rapids and some went to Chicago. I feel that there is something coming out of this that will be a help to the Elbertas—anything that is just as good as the Elbertas, and at the same time a little earlier or a little later will be a good thing.

A Member—I would like to know what Mr. Wilken has to say for the Garber pears?

Mr. Wilken—I hardly know how to answer that. There are a whole lot of varieties that are better. I think the Keiffer is better than the Garber.

President Farrand—If there is nothing further we will now proceed to the next subject on the program, "New Points in Peach Growing and Marketing," by Mr. George Friday, of Coloma.

NEW POINTS IN PEACH GROWING AND MARKETING.

GEORGE FRIDAY, COLOMA.

The subject that I have for discussion is new points in peach growing and marketing. But what some of the growers would call new points other growers would no doubt say they are not new at all, but had been known and practiced for twenty or thirty years.

I have taken a few of the points that I think are usually omitted, at least by many growers, and which they do not follow, whether new or old.

First, I want to speak in reference to nursery stock. We have heard considerable talk about nursery men and nursery stock, and it is undoubtedly a fact that there is some truth in the different things that are mentioned, of stock lying around in the sun so that the roots become dry, of trees being sent out not true to name, and all that, but this can be remedied, and should be, and I believe that it can all be changed when we adopt another plan.

We go to the different classes of farmers. Here is a stock man that has a cow with a history back of her, and for a good many years, as a producer of butter fat or milk. Now, this is the animal from which he raises his best stock and with the right kind of a sire, results can be had that are remarkable.

Then we come to the corn man, and you hear him talk about one hundred bushels of corn to the acre. Do you think there is any haphazard work about this? Does he use any old seed? No sir. There is a careful selection of seed and then there is a thorough preparation of the soil.

Now what are we doing? The nursery man is cross-budding from the nursery rows as a rule—it is the most convenient place he has to get it. He is trying to furnish us a good grower, just the kind that we wanted to grow seedlings. He is furnishing just what we are demanding. We must raise our own nursery stock. The buds that we use must come from our best trees, and I believe that if we could follow this system in twenty years we could double our crop of peaches. I think peaches are a little more important than any other fruits, but it would be just the same with all tree fruits—this question of selection. We must select our buds. We have talked this in our society but there are but a few people who have done it.

After we have the nursery stock we are too much in a hurry. This is one of the reasons why we do not succeed better. We do not make up our mind three or four years ahead where we are going to set out our peach orchard. We get the orchard fever and we immediately plant, no matter what condition the ground is in, and many times regardless of the location. If our soil is not in good condition we should not set out our peach trees until it is in good condition. We will have peaches to sell quicker by doing this way than the other.

Another thing that is neglected throughout the entire Michigan peach belt is the cover crop. There are a few men who do this, but a large majority neglect it, and as a result all the humus is worked out. You

can never raise peaches profitably, without keeping the ground in good condition, and supplying it with that which is taken from it by the trees, and it is surprising what a small amount of fertility is necessary to meet this demand. But nevertheless, it must be supplied if you are to get the best results. We need the cover crops to keep our fertility intact, and save it from being washed out of the soil, and there is nothing like the cover crop for this purpose. It is a well known fact that in years gone by if a man wanted to raise a maximum yield he would summer fallow. That is what we do in our peach orchards when we used the cover crops. We want to use the culture system. We know that wheat will grow nicely on summer fallow ground, because we liberate a lot of plant food which is ready for that wheat crop to take up. Now what we want to do in regard to the peach orchard is to liberate the plant food. Along in the fall of the year our trees do not need much of that food. We want to rob the trees of it so as to ripen them. We have the ideal condition there to grow a large cover crop for a number of purposes. One thing we want to do in order to check the growth of the tree. For this purpose, oats and barley are as good as anything. Cowpeas, soy beans and Canada field peas are excellent. But we also wish a winter grain crop, something that is grown all winter, to take care of everything that is soluble as much as possible, and I believe there is no better growth for that purpose than sand vetch. Sand vetch has been talked up very much in the southern part of the state, but I do not know whether you could do as well in Mason county as farther south.

(A voice) "It is all right."

I know it does very well in the southern part of the state. The object of the sand vetch is to get a leguminous crop. It has been proven time and again that we can grow heavier crops with sand vetch than we can without. You can grow more tons to the acre and it is exactly as valuable as clover, besides saving our fertility in that way, it also adds considerable nitrogen.

Besides, we use liberal quantities of stockyard manure. Our ground is good and getting better every year where we have our peach trees. We sow sand vetch and oats. Some claim that barley is a robber crop, but this will hold the sand vetch all winter and you may know something of how high we value it when I say that we spent \$188 for sand vetch seed this year.

In the spring before the buds start, spray with lime-sulphur and be sure to get it on before the buds are out. This year the United States Department of Agriculture did considerable spraying over the State, and they used some summer spray on our peach orchards—self-boiled lime and sulphur, eight pounds of lime, eight pounds sulphur and two pounds of arsenate of lead. You will find directions in Bulletin No. 125, Department of Entomology. You should spray three times, first just before the blossoms open, just after the blossoms fall, and then as soon as the fruit is well set. The arsenate of lead is to kill the curculio. Owing to the conditions of the weather there was no fungus this year and so we did not have any curculio. The difference between the unsprayed and sprayed did not show so very materially different results. But the closer to the lake shore we got the more the fungus increased, and in some places I have seen where the value of the peach crop was cut in two by not being sprayed. I do not believe it is necessary to put on the

last spray with us, for the last spray that we put on our trees hurt our fruit more than it did good. One spray will control most of the fungus in our orchards.

Another subject that was brought up in the southern part of the State was orchard heaters. After the severe frost this subject is of special interest, and it was undoubtedly used in the west to advantage, but I do not know whether we can use the system here in Michigan. We had some demonstration of them here, but the representative would not do anything when there was any wind. In the valleys perhaps the oil heaters might be of some use, but I do not think they would be of any practical use on the hills.

One of the most important things in connection with raising peaches is the marketing of the fruit and it is one thing that the growers of the State of Michigan are not up to the standard on. What are the new things? We had a large crop of everything this year. We had too many small peaches, and these are a positive hindrance to the market. Then, too, many of them were in the bottom of the barrel or basket. We may have them on our trees, but we want to keep them out of our baskets if we want to make a reputation. That will do more to help our markets than almost anything else.

We want to have plenty of Elberta peaches. As long as we plant Bancrofts, etc., we will have too many small peaches to get rid of.

Another thing, we use a very poor bushel basket. It does not stand up. The basket men are peeling out the side-strips thinner every year and by and by it will be like tissue paper. I do not believe we will be using the bushel basket very long. It is not a satisfactory package for shipment, but the market at present demands the bushel basket for canning peaches. The six-basket carrier is used extensively in the east, and we could use the same if we raised enough peaches of good quality. There they demand the Elbertas, and the canners are willing to pay \$1 per bushel for them, while with us thousands of bushels were sold at from 40 cents to 50 cents per bushel.

I tell you the Michigan peach growers are not getting what there is in the business for them, nor what they could get if they would only go at it right. Here we are located within a radius of 250 miles of 34,000,000 people. We run through a period of three or four weeks. We produce good fruit, but for lack of advertising and putting it on the market in proper shape, we are not getting for our peaches near what we should. We must get rid of the small peaches in the bottom of the bushel basket, however, before we do much advertising. We are now giving in this State the attention to apples that we should have done thirty-five years ago. For the last few years at every meeting we have had, it is apples, apples all the time. We talk of apples as the king of fruits. But we want to remember that we have peaches as the queen of fruits, and it is the queen of fruits that we take to mother the king of fruits. It is the peach orchards that make the future apple orchards and it will take the queen, the mother of the king, to make this State what it should be in the fruit line. Why not grow the queen of fruits and show to the world that we have the best queen, then crown her. No one else will do this unless we do. And it must be done by the entire State and not by one or two individuals.

DISCUSSION.

Mr. Smeltzer—I would just like to make a suggestion that every grower get one of the little rubber stamps with name and a guarantee and put that on every basket or box of peaches that he sends out and live up to that guarantee, and then get a law like Canada, compelling honest work, so that the peaches at the bottom of the basket or box will be the same as those on top—that is what our State needs, and the sooner we can get it the sooner will come this golden dawn that so many of us are looking forward to.

President Farrand—We have something on our program right along this line, so we will not consider this further at present.

A Member—What do you say as to the distance apart that peaches should be planted?

Mr. Friday—I know of men who plant peaches sixteen feet apart and all the way from that to twenty-four and twenty-eight feet apart, and they all seem to be making money. I think each one should use his own judgment as to that. There are more peaches planted twenty feet apart than any other distance. Mr. Rose plants considerable further apart than that, and he is doing well. Most trees in our section are grown from eighteen to twenty feet apart.

A Member—One reason why I asked this question is, that I notice that where the trees are given lots of room to grow there is space for green crops which cannot be done where they are so close together.

President Farrand—We have one cover crop that will grow under the shade of any tree.

Mr. Rose—Did you ever note any bad effect from using lime-sulphur for summer spray?

Mr. Friday—No, but in mixing we were very careful that none of the sulphur went into the solution—on the government experiment grounds there was no bad effect, at least this is the report from Mr. Scott.

Mr. Morrell—There is one very important thing that I think we ought not to lose sight of and that is that the very foundation of your orchard is your nursery stock. The stock that we get from many nurseries is not what it should be. The fact is the commercial nurseries, as well as commercial stock, may or may not be true to name. Personally I was never able to grow a new orchard satisfactorily unless I grew my own trees and handled them as I would a cabbage patch, from my own cabbage bed. I knew then what I was getting. A number of years ago I recall that nursery men disputed very vigorously, contending that you could get a good variety by selecting from parent trees. It never looked logical to me and I think today the advanced men believe in plants propagated by subdivision and selected specimens will surely reproduce that quality. I know it, but I know that it can be improved upon, because I have reproduced it in my own experience since Elberta has been introduced, and I believe that today that the fruit growing districts are sufficiently convinced of that, so that they should have local nurseries that they can go to and take fresh dug trees budded from selected specimens to their farms and set them out and have them cared for at every stage of the game. You had better pay half a dollar each for such trees (although this is not necessary) and then have them make good than getting other stock for nothing or of some little jobber at a

smaller price and take your chances. I tell you it is an awful thing. A man does not grow but one or two orchards in a life time and he can't afford to make these mistakes. I do not believe that the present method of getting nursery stock is right at all, for the man, and I am here to say, as long as it is continued we will not have in Michigan or anywhere else the degree of prosperity that we should have.

Mr. Hawley—I would go a step further than Mr. Morrell. If I were a young man today, just beginning, I should surely learn to bud my trees and I would do my own budding. In this way I would not have to depend upon any nursery man for he is the most undependable man there is in this country. You cannot depend upon them at all. I do not say that they really mean to be dishonest, but the fact still remains that the stock we get from them does not turn out anything near what it should, but every man should learn to bud his own trees and it is not a difficult thing to learn. Then he can select buds from the very best known bearing varieties. And more, these buds will come from trees in his immediate vicinity which is an additional assurance that they will do the best possible for him. You cannot always get trees from away off that will do as well as trees from one's own locality. So the thing for a young man to learn to do is budding and grafting and then you have the whole thing within your own control.

A Member—I have no axe to grind in this matter. I have bought from one nursery for eighteen years and have planted 8,000 trees and I have been very much pleased with the results of the stock I have received from them. I believe that we are ourselves somewhat to blame for the conditions referred to by the previous speaker. Agents will come through the country offering trees for sale. They want so much for their trees, representing that they are just as good or perhaps better than some other trees, as many of the growers are anxious to get the stock as cheaply as possible. The cheapest man gets the order, but this does not always mean that this is the best stock. I did have one experience with a nursery wherein I failed to get what I should, and I never bought any more from that firm. Then I wrote to the nursery and told them what I wanted, that I expected to plant a good sized orchard and that I wanted to contract with them for my trees. The proprietor wrote back and said that they would be glad to do business with me and he made a proposition like this: We will make a contract with you if you buy all of your trees from us and guarantee that they will all be true to name and, if they are not true to name, we will pick a man and you select one, and these two select a third, and whatever they say the damage is, that we will pay. I signed up a contract with them to this effect and my dealings for years have been most satisfactory.

Mr. Hale—I hardly agree with Mr. Hawley for I have had just as unsatisfactory experience with nursery men as he has had good. We have some good straight, honest nursery men, but the majority of them are not careful enough in handling their stock so that the buyer can depend on always getting what he expects. And yet, it is not always the nursery man that is to blame. I think a large share of the trouble comes from the middleman. If we would only cut out these fellows and buy our stock directly from our home nursery men, I am quite sure we will save lots of trouble.

Mr. Wilken—Even though you do your own work sometimes you get



Wealthy Apple Tree, 17 years old, on south farm owned by C. E. Youngs & Sons, Rives Junction, Jackson County.



It took 17 loads like this (100 barrels to the load) to draw the empty barrels for the 1911 crop of C. E. Young & Sons, Jackson County.



A fine bunch of Wealthy Apples—every one perfect—on south farm of C. E. Young & Sons, Rives Junction, Jackson County.



A merry apple harvest on the old farm owned by C. E. Young & Sons, Rives Junction, Jackson County.

slipped up on it yourself. I know a case in South Haven where a man took a Northern Spy and grafted it on to another tree. The result was a Winter Banana. I know of another peculiar instance. A man had a vineyard of Concords. One year he went through and he found some fine white grapes and the next year he went through and found white and blue grapes. Now that is not a fish story. If we had blue grapes on a twig of Concords, that would be due to bud sporting.

A Member—But the fact remains that when we did our own budding to make our own selection from stock that we know produces all right, gives the right kind of fruit, healthy, vigorous and heavy bearing, we will be more apt to get more satisfactory results than otherwise. If you had a Holstein cow that produced nine pounds of butter, would you prefer stock from that strain rather than from cows producing only four pounds of butter?

A Member—If I was going to buy a cow, the first thing I would do would be to get a Babcock tester and test her milk and if she was up to the standard, then I would buy her, if not I would turn her down.

A Member—But how about buying a calf?

Answer, Mr. Morrell—There is no more important question. If I buy the calf by all means I want to know what its ancestors are and I certainly think I would not buy a calf for milk unless the ancestors were heavy producers. The chances are that you will get a good animal. In this connection I wish to say I am very much in favor of the dairy cow on the fruit farm and, handled right, can be made pleasant and profitable, and too, along with the orchard I think that I may add, the dairy hog as well as the dairy cow, is a fine thing.

Mr. Smythe—I would like to ask Mr. Morrell if he is satisfied with the present way to obtain seed of our peaches?

Mr. Morrell—That is not the best way. I do not do that. I buy seed down in the Cumberland mountain region, where there are a lot of seedling peaches grown and the people cut them open and sell the pits, they are very strong. They grow fine stock and run about 6,000 to the bushel.

I am not a nursery man, but when I am planting an orchard I agree with the nursery men, and grow nursery stock enough to set that orchard. I do not want this particular phase of the question to pass out of your minds, because I believe just as Mr. Hawley said, "That if you have what you want in your own orchard, or in the orchard of your neighbor has it, you can get your buds, you can get your long scions, you can grow them for half of what you are paying for them and you who plant a couple of years ahead—with proper ground for your orchard and you will be so much better satisfied in the end.

I do not want to knock the nursery men, I do not want to say they are responsible for all the sculduggery that comes into the business, but I know he has to stand for it and I do not intend it shall be me.

There will be a good deal better success in growing peaches if this is followed than most peach growers have had before. Take the blackberry plant for instance, if you take root cuttings and grow them the final outcome will be much more satisfactory. It is the little care in these foundation operations that makes the difference in the success of fruit growing. Mr. Friday is trying hard to make you understand this, but it is worth more than most of us appreciate.

I have one tree in one of my peach orchards that has given me twenty-

one peach crops, and most of the other trees in that orchard have outgrown their usefulness. Now that was my old tree, and I have left it because it was loaded down with fruit and always bears big peaches. Every year some man has asked me if he might pick off that tree and by keeping check on it I have a record of what it produces. Two years ago nineteen bushels were picked off that one tree. Now I want to ask you, is not that tree worth more to me to propagate from than another tree that does not yield so profusely. I have tried to find out what made that tree better than the other ones, but there does not seem to be anything to indicate that it is better except that it does produce fruit. So when I am budding I use these trees just as far as I can and I think this is the principle that we should work on when we plant our orchards.

President Farrand—I am glad for these good suggestions from one of our peach growers and I am very sure that they are sound and can be safely followed. Mr. Bassett has a word to say before we close this session.

Mr. Bassett—Across the road is the fruit show of Mason county. In the automobile garage two blocks away is a display of spraying machinery, and it is hoped that every one interested in any way will make it convenient to visit the place.

IMPRESSIONS ON APPLE GROWING IN DIFFERENT STATES.

HENRY WALLER, CHARLEVOIX.

I wish to consider briefly these states in regard to apple growing: Illinois, Virginia, Oregon and Michigan.

Illinois, my native state, ranks among the first in number of apple trees planted. In her apple production, however, during the last few years, Illinois has fallen off badly and does not today rank high among the great apple producing states. The reason for this seems to be that of late years the weather conditions have been most adverse at blooming time. This has had a discouraging effect on many of the growers. There are among them, men of strong courage who take a hopeful view of the situation and believe that a changing cycle of years will bring favorable weather while the trees are in blossom.

The great apple belt of the state extends across the state from east to west about as far north as Springfield and as far south as Centralia. In this region some of the soil types are comparatively poor. Too poor to make good farming lands without being built up by careful treatment and the addition of fertilizers. On the silt and clay soils apple trees grow well. In this section apples are grown on a large scale. Orchards of from 60 to 200 acres being not uncommon. Ben Davis is the chief variety grown and although it usually sells at a low figure, it is such a productive variety and finds such a congenial home here that it usually pays the orchardist well. Jonathan and Grimes Golden both succeed admirably in the apple belt and in other parts of the state and are largely grown. In the extreme south part of the state the Wine-sap does well and has been extensively planted. Illinois apples of qual-

ity have a good reputation in the market. Like New York and Michigan apples, they have a high flavor, good size and fine color. Apple trees in Illinois are not long lived. At about twenty-five to thirty years they usually cease to produce profitably. Trees are commonly pruned to the vase form. Comparatively low heads being the rule. They do not grow as large as the trees of New York or Michigan. Illinois, although not generally recognized as a great fruit state, has some of the finest orchards in the country. In Illinois the grower sprays for the codling moth, the scale, scab and in some sections for bitter rot.

Clean cultivation is the rule in all well cared for orchards and the use of cover crops is constantly growing.

In marketing their apples, the barrel is still almost universally used. Each year, however, finds some growers packing apples in boxes.

Turning now to Virginia, we find that this state is developing rapidly, both in production and in the number of new orchards being planted. There are two distinct sections in Virginia where apple growing is of great commercial importance. Piedmont, Virginia, the home of the famous Albermarle Pippin and the Shenandoah Valley.

In Piedmont, Virginia, with its predominant soil type a red clay, or silt soil, the Winesap reaches great perfection and is the chief commercial apple. The Albermarle Pippin succeeds splendidly on a certain dark, brown, loamy soil occurring in comparatively small areas. The York Imperial is also largely grown on the red soil and does well. It is a region extremely picturesque, because of its rough and broken character. Steep slopes are common and are often planted to orchards making them difficult to cultivate and spray.

Because of the ruggedness of the country, many orchards are left in sod, but where it is feasible, clean cultivation is the practice.

Trees are usually pruned to the vase form and are headed about two and a half feet from the ground. The trees grow very large and are long lived. A great development is going on in the setting of new orchards on a large scale.

The growers have the scale and the codling moth as their most serious insect pests. While scab and bitter rot are the most important fungus diseases.

In the Shenandoah Valley, we find a limestone country. A region of low, rolling hills, the slopes of which are nearly ideal sites for orchards.

The York Imperial is perhaps the chief commercial apple, but Winesap and Ben Davis are also important commercially.

Some of the best work with orchards in the country is being done in the Shenandoah Valley. Nowhere do you find any more beautiful orchards. The business is proving very profitable and a great development is going on in the planting of new orchards.

Spraying and cultivation is very thoroughly done.

While the barrel is still the chief package employed by Virginia growers in disposing of their apples, the box is gaining in favor steadily and is being more largely used each year.

Perhaps the most dominant impression I gained of the growing of apples in Oregon is its intensiveness. It is not surprising therefore that the very small orchards of three or four acres or more pay relatively much better than the large orchards.

I spent sixteen months working on fruit ranches at Hood River and

in the Willamette Valley. At Hood River the business of growing apples is perhaps the most highly developed of any section in the country, at least, no other section has developed the business any further. It is a community which is almost entirely devoted to the raising of apples. A community made up of wide awake, intelligent, hustling people who have become highly skilled, drawn from nearly every walk in life. They are intensely jealous of the reputation which Hood River has and every man, woman and child among them is a booster. A spirit of friendly rivalry exists between the growers, each one trying to outdo his neighbor by getting a higher percentage of clean fruit, getting better color, or producing a larger net return per acre. At the fruit exhibits the competition among the growers is very intense. Prizes being given for a certain number of the best packed boxes of Spitzenbergs, Yellow Newtowns, Ortleys and Winter Bananas, also for the best general collection. More than once I heard the Slogan "Hood River against the world." The Hood River apple grower's union is probably as fine an example as can be found of the value of a strong association to build and maintain a reputation for raising apples of the highest quality, free from blemishes and well colored, uniformly and skillfully packed. Hood River prides itself on its pack and guarantees it one year with another. By restricting themselves very largely to but two varieties, the Esopus Spitzenberg and the Yellow Newtown Pippin, the association is enabled to ship in solid carloads. By using these methods, the union has been enabled to sell year after year, almost their entire crop F. O. B. Hood River at very satisfactory prices. The union advertises extensively in magazines which results in attracting new people to Hood River, many of whom buy land and set out orchards and establish permanent homes.

As to the methods which the growers employ in raising their apples. They believe in doing all their cultural operations thoroughly and with the utmost pains. Each grower studies his trees and his soil. He tries to spray and thin his trees at just the right time and starts and leaves off cultivation of his orchard according to the conditions existing each season.

Spraying is done by hand pumps in the small orchards and with power sprayers, both gasoline and steam sprayers being used. Before the buds open, it is quite commonly the practice to give the trees a clean up spray of lime-sulphur for both scab and scale. In spraying for the codling moth, there is a divergency of opinion. Some growers spraying only once for it and at the stage in the development of the apple just before the calyx cup is closed. Others at that stage and at various intervals three or four times or more a season. It is the custom to spray two or three times each season for scab, before the buds open, after the bloom falls and two or three weeks later.

When the apples have set and reached the size of small marbles from about one-third inch to one-half inch in diameter, thinning commences. The little apples are either snapped off with the thumb and forefinger or snipped off with small shears. Only one apple in a cluster being left, usually the center one, but the aim being to leave the largest and most perfect apples. Some growers thin to six to eight inches apart.

A large part of the cultivation is done with a disk harrow. Various types of smoothing harrows are used. The orchards are kept beautifully level with what is called a leveler, consisting of two planks twelve

feet long or about which are set on edge and are fastened together near the middle by two other planks parallel to each other and about four feet apart and at right angles to the first two plans. The horses drag the leveler by means of chains fastened to the first two planks or runners. The Kimball weeder or cultivator, an implement which stirs the soil without disturbing the surface mulch is very generally used. Cultivation usually ceases sometimes in August and the use of cover crops is increasing.

In harvesting their apples, tin pails, padded baskets and various forms of picking sacks and aprons are used. The utmost care being taken to keep from bruising the apples at any time. After the apples are picked, they are deposited in orchard boxes and hauled away to the packing sheds, where they are wiped, sorted and packed. A word as to packing. The packing is done by the association and so a uniform pack is put up. Crews of three or more packers, under the direction of a head packer, pack according to a set of instructions furnished by the association. They go around among the orchards and stay at a ranch until the packing is completed and then move on to the next ranch.

Just a word as to pruning. The trees are headed very low. It is usual to head the trees at from eighteen to twenty inches from the ground. The vase form is almost the only system used. The trees are pruned with very open centers and this, taken together with the clear, bright, sunshiny days, explains the high color their apples take on.

In closing this paper, I wish to point out some advantages which we, as Michigan growers, possess, and some lessons that we can learn from our brother growers in these other states. We certainly have great advantages in location and in having both rail and water transportation and in nearness to market, and its consequent lower transportation rate. Michigan raises apples of the highest quality, firm in texture, of the highest flavor, of excellent keeping quality and with high color if the trees are kept sufficiently open and the apples are left on long enough to take on the same wonderful polish that sells western fruit. There is no question of the superiority in flavor of our apples over all western apples. There was only one western apple that I tasted, while in the west, that I considered approached our eastern apples in flavor and that was a fall apple and not of much commercial value to them, the Gravenstein.

At Hood River they have found that a very few varieties of the highest quality succeed splendidly in their section and they confine themselves to these. We ought to learn the same lesson. In the different sections of Michigan the apple growers ought to confine themselves to two or three varieties of as high quality as will succeed in the region. The public is rapidly becoming educated to the differences in quality in apples and the demand is becoming stronger each year for the better apples and at better prices comparatively, while poorer apples are rapidly becoming a drug on the market. We must take better care of our orchards, give better attention to spraying, cultivating and feeding our trees and practice more open pruning and we will assuredly get better results. Then, we must attend better to the business end of apple growing. We must adopt the association idea. Lastly, we ought, like the best apple growers all over the country, east and west, study our trees and our soil and

really throw ourselves full of enthusiasm into the business of making Michigan apples lead the world.

DISCUSSION.

President Farrand—I think we can all, as members of this society, feel gratified in hearing this paper of Mr. Waller's. And there may be others here who could give us some interesting facts and I think it would be well to carry this one topic a little further, in order that others may give us their impressions, their visit to other states. Mr. Rose, what do you say?

Mr. Rose—My impression is that we are as well located as anybody. I have never been in Virginia and the northwest, but I have seen these apples growing in the middle west, and I know they are very nice, but they do not have the quality that our apples have. The trade is, I think, quite well satisfied—the thing for us to do is to work up to the point where everything is put up as it should be, and then we can talk, and our talk will amount to something. Then I do not think the western fellows will have such a good time as they have had in the past. I think the observations in the paper read are well taken, and what is said in reference to growing apples in Illinois, and the reason assigned is doubtless the correct reason. I have noted that that the Indiana, southern Ohio and West Virginia orchards are coming to the front, and will ere long be competitors of ours. They have the right soil and ideal locations. I know that Mr. Joe Burton has made as great a success as any man in Michigan, and the chief secret of this is the fact that his soil is especially adapted to raising apples.

I went down to the Indiana exhibit at Indianapolis and in some respects they had us beat. Their Grimes Golden and Northern Spies were so fine that I did not know what they were, and for this I was laughed at. I think they have a great future before them.

A question was asked about Rome Beauties. No one seemed to know much about them. My brother sent me some grafts from southern Illinois, and I grafted on Russets. They grow larger here than anywhere else, but they lack color. In the south it gets a better color and is regarded as a very nice apple indeed.

President Farrand—What is your impression after visiting Virginia territory, and possibly Oregon territory—what will be the effect of planting so many apple orchards as you saw on the future of the business?

Mr. Waller—Mr. E. L. Smith recently stated in an excellent paper that he fears very much that the ordinary apples are being over-crowded in the west; the apples of the higher type, like the Spitzenburgs and Newtown will continue to command good prices. Virginia being so close to the large markets of the east, and growing excellent apples, I believe will be able to maintain herself and sell what she raises at good prices. Of course, the better the quality of fruit, no matter in what quantity it is grown, the better it will sell.

Mr. Smythe—Is it not true that they have the codling moth—a man said to me recently, "One thing we do not have which you do." And I said, "What?" and his reply was, "The codling moth."

Mr. Waller—It is not so in Oregon, but I understand that there is

one section in California, a very small section, that so far they seem to be immune from the codling moth.

A Member—To what do they attribute that? Why are they immune?

Mr. Waller—To the peculiar climatic conditions. It is a very narrow belt or strip, something like three miles. On the other side of this belt, a little further back, the codling moth is as bad as in any sections of the west. And I have heard of isolated valleys in Oregon where the codling moth as yet has not been seen. But I think it will be only a matter of a few years until the codling moth will spread and be there.

A Member—The explanation a western man gave me as to why these several districts were immune was on account of the nights being so cool that the codling moth could not propagate there.

Mr. Smythe—Do you believe it?

President Farrand—Thirty years ago we were immune from it in Michigan. Perhaps there is an explanation in the life history of the insect. The female moth does not fly—it is a sluggish creature that simply crawls around. This being true, the theory of its flying is knocked out. All we can say is that it has not yet got to these isolated places, but it will get there just as certain as they get the San Jose scale.

Mr. Pratt—I have a brother that has been all through that north-western country in the employ of the government. He has just returned and tells me that this year their crop was light and they omitted one spraying. He says they have the fungus disease as bad as we.

Mr. White—I recently had the privilege of talking to one of the expert entomologists of the Oregon experiment station, and he said that they had these fungus diseases and other pests out there just the same as we do, and that it was the real estate men who were giving out the impression that they were immune from these troubles.

Mr. Smythe—The public at large that are buying western land think that there are no diseases to fight out west, but when they bump up against the real thing they find out different. I don't think that we are the only country in the world that has all the pests.

A Member—Where is that place in California where they do not have the codling moth?

Mr. Rowe—I have had the honor as well as the privilege of judging the fruit at Watsonville for the last two years, and there were two large exhibits of fruit from this region, last year there being six carloads and this year forty-two carloads from this valley. It is close to the coast. The first settlers that went in there were stockmen, but their sons all went into wheat growing for fifteen years. Then their sons in turn went into fruit growing and now practically the whole of that valley is in apples. And that valley produces more apples than any six western states. I know that is a large statement, but the figures will bear it out. These show that the states of Washington, Oregon, Idaho, Utah, Montana and Colorado have produced on an average for the last five years 4,621 carloads a year, while the Prospero valley has during the past ten years produced annually over 5,000 carloads. During all these years that they have been growing apples there, they have had but one failure, and that was eight years ago. Up until that time one of their greatest pests had been the codling moth. And it stayed with them in spite of their sprayings, and they had at least from twenty-five per cent to forty per cent of wormy fruit. And that is why the great can-

ning plants that are there were started—to take care of their imperfect fruit. They produce over fifty-three per cent of the evaporated apples put up in the United States, over 30,000 tons a year for the past five years. In the latter part of July of that year of failure the fog which keeps them cool during the summer season, disappeared and stayed away, and the apples just literally cooked on the trees. They had practically no apples that year. The codling moth which had been so prevalent before, since then has been but little in evidence, although we found evidence of it in all the exhibits to a greater or less extent.

A Member—My cousin has just returned from a trip out in that north-west country and he says that he found one section where there had not been any, or at least he did not see any evidence of the insect, but it was just beginning to get in there.

Mr. Rowe—You may go into these orchards and you do not find any wormy fruit. They sell all their cull apples to the Chinese. They go through their orchards every other day and everything is picked up. All the early drop fruit is evaporated or canned or made into cider. Nothing is wasted. That is one remarkable feature of that section. You might go through that section and hardly see a wormy apple, while at the same time there may be as many wormy apples as we would have here, or more.

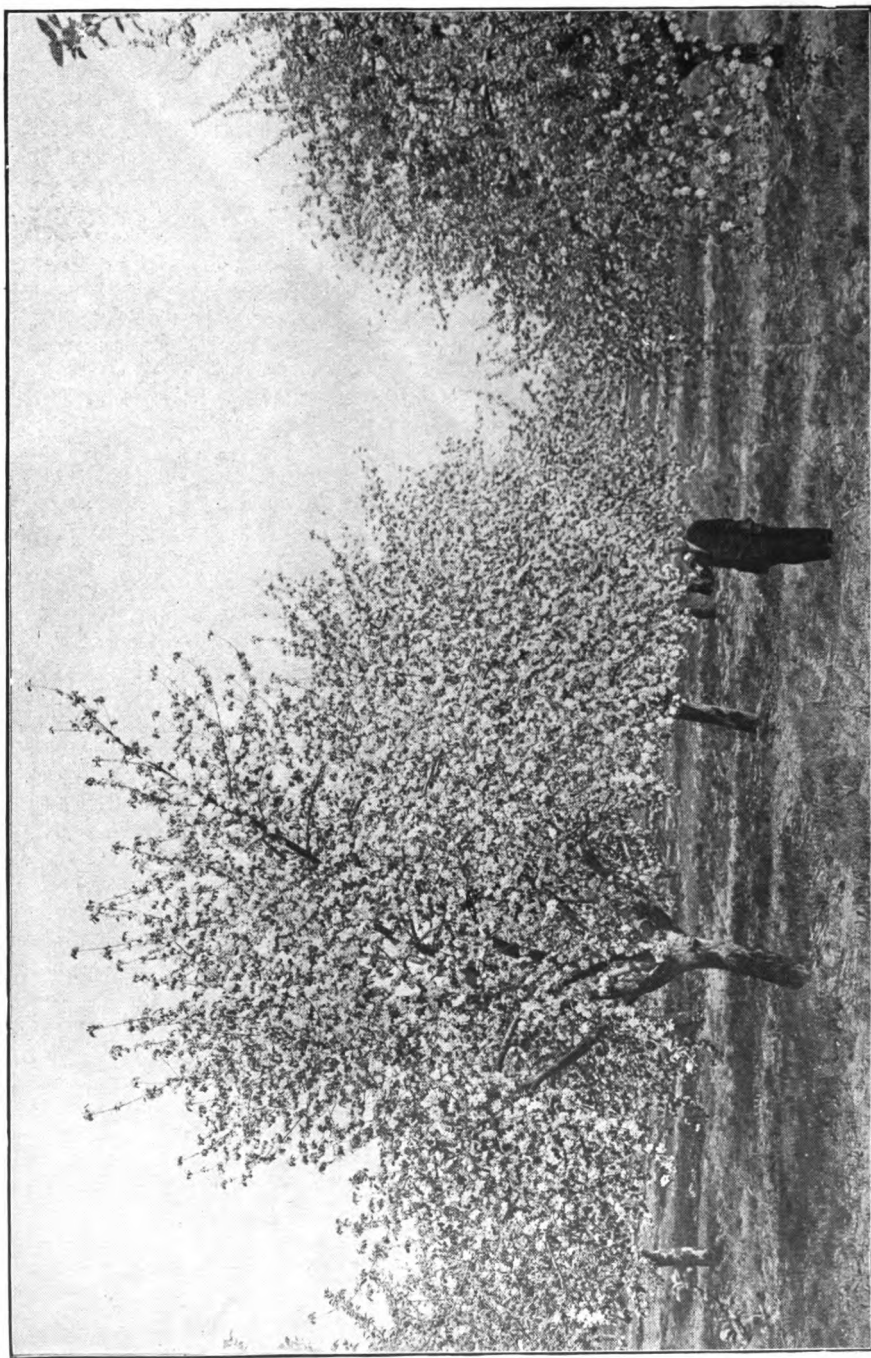
A Member—I understand that in Fennville there is an orchard owned by a man who offered \$100 if a wormy apple could be found in it. I understand that one man spent seven hours of time trying to find a wormy apple but failed.

SELECTION AND PREPARATION OF AN ORCHARD SITE.

O. S. BRISTOL, ALMONT.

Ladies, Gentlemen and Brother Fruit Growers—I am glad to see you all today and if you will kindly listen to me for two and one-half hours I will try to explain something about orchards. At home, where I am known, the people all take to the hill country when I am going to speak. Whenever I do get a chance to speak, as a rule, I watch the audience, and as soon as I see that they are all quietly sleeping, I slip out. I am something like a woman I heard of who was considerable of a talker. Her husband was a saloonkeeper. One Saturday night he came home late and his wife began talking to him on the temperance question, which was her favorite theme. He tried to quiet her, but without effect. She said to him, "I would like to have anybody tell me one good thing in favor of the saloon." He replied, "My dear, there's one good thing about the saloon." She was all animation in a moment, and said, "If there's any good thing in a saloon I would like to hear of it," and his reply was, "They have to shut up at eleven o'clock." (Laughter.)

In regard to selecting a place to plant an orchard it seems to me that it is a very important question, because I think that probably more failures in the apple business come from not planting in the proper place than from almost any other cause, in other words we can attribute more



Nature's effort to produce a "bumper crop" may result in failure on account of exhaustion during the blossoming time. Better prune and thin.



A big crop of Baldwin Apples on farm of W. M. Pratt & Son, Benton Harbor.

failures to that one thing than to any thing else. All over the country we see where people have set out orchards of different descriptions that have failed to produce a profitable crop simply because they were set upon land that was not adapted to growing fruit.

Perhaps it is a hard matter to always know how to pick out the proper place. This can be divided into two questions. Here's a man that wants to plant a small orchard for family use, and have a few to sell. There is no place on his farm adapted to growing that fruit, and yet he must take into consideration that he would like to have this fruit near his house, but near his house, perhaps, the ground is not suitable. I would not refuse to plant any trees, because I did not have the best land for orchard planting, but I would pick out some point where I thought they would grow best. Then there are sections where the whole country is well adapted to growing fruit and the person could not make any mistake along that line:

Now, in regard to the kind of soil. I have thought before now that I could tell the kind of soil I wanted to grow fruit on. I have seen very successful orchards on sand, on heavy clay, also on gravel and on a great many variations from sand to the clay and gravel. I never saw a successful orchard on muck, hence I naturally think that muck places would be a poor place for an orchard. But I will say this, I have been somewhat stumped on looking at the soil to see what it would produce,—the best results, in some localities or in some parts of the site, for instance, where the soil varies,—it would be hard to tell unless you had planted an orchard and had grown it for twenty years, which part of that land would be best, perhaps the part that you would decide on as being the best would prove to the contrary and vice versa. Hence, I say it is impossible to see on looking at the surface of the soil exactly what that soil will produce. Now, for an illustration—the present year I rented an orchard to a neighbor, and in that orchard there was a gravelly knoll and they were throwing out gravel to make cement. One said to me that he could get a good deal more money out of that land at fifteen cents to twenty-five cents a yard than growing apples, hence he opened up a pit in the middle of the orchard and they had dug into some of the trees and let them down into the pit and had taken them away. He said to me when I rented the orchard that the trees that grew on that gravel knoll did not grow very fast nor produce much fruit. Now on looking it over I saw that the trees had not made so much growth as in some other parts of the orchard, but I did not wonder at this, when I learned that the orchard had never been cultivated since it was set out twenty years before, it having been used simply as a pasture for sheep and hogs.

What I want to say is that I was very much surprised to find that some of the very nicest fruit in that orchard grew right on the top of that knoll. There was a little soil on that surface, reddish clay and gravel soil, that one might naturally think would not produce fruit, but it certainly did give an excellent yield, and I have some specimens of apples that came off that knoll, what are known as Steele's Red, and I am sure that you will agree with me that they are good enough for anyone. (Exhibiting specimen.)

And in this connection I want to digress a bit to say that I have tried hard to make the people believe that we should call this apple Canada

Red, in order to establish one name. As it is, it is a little misleading. A great many think that Canada Reds and Steele's Red are two different apples, but in the early time when the Canada Red was first introduced, it was known as the Steele's Red, and they are one and the same apple.

While you cannot tell for certain what the soil is, when you come to the subsoil, then you can get a pretty good idea. A subsoil that is open and porous, I do not care whether it is gravel or clay—if it is a soil that will allow the roots to go down into the earth it will be pretty sure to give good results, for the roots will go down to the moisture and the moisture will come up. The soil that is too wet will not produce the best crops of fruit. We all know that when you go into a wet place there is where you will fail so in selecting a site. We should find one that is naturally drained. Of course, if you are putting out a small orchard you could drain that out and make a pretty good orchard, even though the ground was wet, but I would hesitate to go onto a piece of land where I had to drain it for a commercial orchard, for a commercial orchard I would try to get hold of land that would drain naturally itself, for the reason if you have to go to work and drain out the land there comes a time when these drains become clogged up and you have more or less trouble with these drained lands, especially in orchards where the tendency is for the roots of the trees to fill up the drain which it will do in time.

And often we find that the place where it is desired to plant an orchard may have some portion of that land, has what is called "water pockets." I have seen places where the land was naturally very dry as a whole, but where the drain would have to be put in at these particular points.

We want soil that will grow fruit of all kinds, of course, there is considerable in the site but not all, whether we plant apples or peaches some in the kind of elevation. We can secure apples on good land on the level but in our part of the country we fell down in growing peaches when we got down on the level where the frost of the spring would injure the fruit buds, etc. Hence, the land that lies above the surrounding country, I find, though it be only a few feet above, will give better results than on the dead level.

If you will pardon me for referring to my own situation, I have an orchard of twenty-three acres. A part of the trees are nineteen years old and a part of them are only twelve, on the last part of it I came down the slope about half way, and there I seemed to strike a frost line, I have not raised enough peaches below that line to pay the expenses of the orchard, but above that it has done very well.

Besides the drainage of the water you need also the drainage of the air. You know as you come through the low places you will feel a cold current of air. When the frost comes these are the places that are attacked, while on the high places the fruit is not injured.

Now, I desire to say a few words in regard to the preparation of the site on which it is desired to plant an orchard. Of course, we would feel like not doing all that we think we should, but I believe that men could afford to spend some time in preparing a field for setting out trees. That is, work the soil for a few years, fertilize heavily, grow a crop of clover, plow it under, and get the field into shape for setting out the trees. I like to grow hoed crops previous to the setting out to make the field very clean.

When you set out your trees you can cultivate and work them and get them started and you will be a good ways ahead if you thoroughly prepare the ground before the trees are set. Sometimes we get in a hurry to set out the fruit and do our cultivating and preparatory work afterwards. During the past seasons I have been setting out a peach orchard on the site that I selected some twenty-five or thirty years ago. True, I have not been preparing the ground all this time—I would have set it out earlier but another man held the deed and I was unable to get on to it. But I worked that ground for two years preparing it to set out a peach orchard. This spring I put out the trees.

If you have your space prepared there comes the question as to how you will set the trees so as to get them in any kind of shape so that they will look well after they were set. I have generally made a practice of plowing the ground and marking it, where it is comparatively level, with the corn marker. If the trees were set twenty feet apart I would mark the ground both ways as I would plant corn. This year our land had not been plowed and I wanted to set the trees twenty feet apart, so I went to the woods and got two light poles and with another man staked out one side of the orchard at right angles. I set stakes every twenty feet and with a pole measured from the corner and stood a small stake where I wanted a tree all over the field, they stood in perfect line in every direction. The man had a better view than I did. If the land had been plowed I would have marked it with a marker.

There is much more that might be said but perhaps my two and one-half hours is up and you are not all asleep so I will close.

CARE OF A YOUNG ORCHARD.

E. O. LADD, OLD MISSION.

This topic would naturally begin with a young orchard already set out and take it along up to the bearing age, but so much of the success in growing an orchard depends on previous conditions that I want to go back a little and briefly speak of the location, preparation of the soil, selection and planting of the trees. The influences of heredity and environment are as strong in plant as in animal life, hence the necessity of getting trees from reliable sources propagated from stock having the bearing habit, young, thrifty, well rooted and true to name. The most critical period in the life of a fruit tree is from the time it is taken from the nursery row until it is firmly established in the orchard. I like to get the trees in the fall if possible and heel them in during the winter and have them to set in the spring as soon as the soil can be got into proper condition. The preparation of the soil is of great importance. It should be under a good state of cultivation, being well supplied with humus and available plant food. If the soil is not in proper tilth better wait a year or two before planting the orchard and get it into ideal condition.

I believe it is important that the trees be well anchored to the soil and to this end I would favor rather deep planting, somewhat deeper

than they stood in the nursery, then by cultivation during the growing season, which I believe is the only method that should be practiced in a very young orchard, we encourage the roots to go down deeper than they otherwise would. We all know that a large proportion of all the trees that leave the nursery never live and grow to become profitable producers of fruit. This is due I think largely to carelessness in handling and planting and neglect during the first two or three years of their growth.

There are two things that every person who has the care of a young orchard should keep always in mind and strive to accomplish.

First. To get a uniform and even growth each year and as large a growth as is consistent with the thorough maturing of the new wood so as to maintain a healthy and vigorous condition of the trees. This to the end that when they shall have attained the bearing age they shall have the size and bearing surface that will enable them to produce paying crops of fruit.

Second. To so handle the soil as to conserve the elements of fertility and add to its producing power against the time when the trees must draw more heavily upon it for the production of fruit. How to accomplish these two objects for best results, at least expense, is the problem before every person who has the care of a young orchard.

I have often been asked the question, how much will it cost per acre to care for a young orchard from the time it is set out until it will begin to bear fruit? This is the question that cannot be answered definitely nor even approximately without knowing all the circumstances. Much depends on the kind of fruit trees, the character of the soil, whether the owner lives on the farm or not and what system of farming is practiced on the remaining portion of the farm.

Michigan is a state of great and diversified resources. Some people are fruit specialists confining their efforts entirely to the production of fruit, but the great majority of Michigan farmers who grow fruit, do, and I think always will, combine fruit growing with other branches of farming more or less diversified. In my own case I have narrowed it down to two lines of work and seek to produce for sale from the farm nothing but fruit and dairy products.

On a farm of fairly good soil, where live stock is kept and where not over one-third to one-half of the cultivated area is devoted to fruit I believe that if the trees are set the proper distance apart the land in young orchards, especially an apple orchard, may be made to pay all the expense of taking care of the trees from the time they are planted until they begin to produce paying crops of fruit. My custom has been to grow forage and soiling crops to be fed out to dairy cows, returning to the orchard at least an equivalent in stable manure for all the fertility removed by the crops taken off. The cultivation necessary to produce a good crop of corn will encourage a good thrifty growth on the trees. It should begin early while the moisture is in the soil and be kept up continuously at short intervals until the middle of July or first of August, when a cover crop should be sown. I want to emphasize especially the importance of frequent thorough cultivation for the first two years. Young trees that are neglected the first year may live and make some growth but are more apt to die the second year. A space of four feet or more on each side of the rows should be kept under con-

tinuous clean cultivation until time to sow the cover crop which should never be omitted. We must remember that cultivation is an exhaustive process on the soil, using up the humus and liberating plant food which if not taken up by the roots of growing plants may be lost to the soil. The growth of the cover crop takes moisture and fertility from the soil which tends to check the growth of the trees just at the time when they should stop growing, holding that fertility over the winter and giving it up for the next year's growth of the trees. It also adds humus to the soil helping it to retain moisture, holds the surface soil from blowing away and protects the ground during winter from severe freezing.

The remaining spaces between the rows may be devoted to growing forage crops and for this purpose we have used mostly corn and medium red clover each grown in alternate spaces. The strips on which corn grows one year will be in clover the next year. Seeding is done at the time of the last cultivation of the corn and a light seeding of oats also sown with the clover seed. The oats grow taller in the fall than the clover, help to hold the snow during winter and serve as a mulch for the young clover plants. If any of the clover is used for feeding it should be the first crop cut quite early and all the remaining growth left on the ground. The corn is either fed green to the cows or put into the silo. As the trees grow the strips on either side of the rows for cultivation should be widened and finally the corn growing dropped out entirely. I have also used peas and oats, rye and winter vetch for soil-ing purposes.

For a cover crop to be sown on the space that have been kept in clean cultivation I know of nothing better than a mixture of oats and winter vetch. The vetch is a great nitrogen gatherer. Clover and stable manure also supply humus and nitrogen and when these are present in the soil in large quantities the mineral elements of plant food are more readily available. By alternating corn and clover we get the full fertilizing value of the clover plants. I have also used occasionally a light dressing of ashes on the farm for the young trees and sometimes hauling them sixteen miles for that purpose. This, however, is done in winter when the team is not needed for other work.

I want to emphasize the importance of care in working around the trees. A careless man has no business in a young orchard. Barking of the trees may result in great injury to them.

Protection from girdling by mice and rabbits may be secured by banking up around the trees late in the fall or by the use of tarred paper or other material wrapped around the trunks of the trees. There are also various liquid preparations to be applied to the trunks with a brush but I have never used them.

It would seem unnecessary to speak of the importance of keeping the foliage in a young orchard in a healthy condition for best results in growth of the trees, but it has been my observation that spraying is often sadly neglected in the young orchard. Pruning is also a matter of great importance. The young trees should be started right, headed at a uniform height and as low as we can and still give room for cultivation under the trees. By giving attention to pruning each year we may avoid the necessity of ever having to cut off very large limbs. We should aim to secure a well balanced top, compact enough to hold up its load of fruit, yet spreading and open enough to give all the bearing surface

possible and to admit light and circulation of air to all parts of the tree.

A closing thought comes to my mind that he who plants and cares for a young orchard looks forward with hope and faith in the future, but if that hope is to be realized the treatment of the young trees as they approach the bearing stage should be in harmony with the best principles of orchard management. We should guard against over production by judicious pruning and thinning and thus seek to establish the habit of moderate annual bearing. This will conserve the energies and prolong the life and usefulness of the trees, keep them and the owner young and vigorous to a good old age. "You take good care of that orchard and it will take care of you."

DISCUSSION.

President Farrand—Let us make use of Mr. Bristol and Mr. Ladd in every way we possibly can. There is one question on the program which might come up under this head, "Will it pay to dynamite orchard ground?" That is a pretty good question.

Mr. Ladd—I cannot answer that question because I have had no experience. I think there are cases where the soil is hard and impervious that dynamiting might be all right—I do not think on my soil it would be of any benefit.

Mr. Dow—I have dug a good many holes around trees and put in some surface soil and then took the sand that I took out and spread it on the surface of the ground. Our soil is light and I never dug a hole deep enough to find those roots—and this I think is a very good explanation as to why they got no benefit from the manure and fertilizer on the ground,—the roots are lying in the lower layers. Prof. Hedrick stated that the only condition that they had before them that influenced the result was the rainfall—that the water was the limiting condition in that orchard. These experiments were most carefully conducted and every source of error was perfectly guarded against. These questions that apples will not grow on wet land but will grow on sand hills are pertinent—the Spy apple will grow on a hill where you cannot raise rye.

A Member—I have never had any experience in using dynamite but I have had some experience in subsoiling where I have heavy clay subsoil. Where small fruits are raised, if the subsoiling is done in such a way that there is no chance for the water to drain out of the lower ground, it seems to have the same effect as drowning a plant. And if a tree won't stand wet feet, I would doubt the advisability of using dynamite, but use holes where the soil is impervious to the water.

President Farrand—The trees have suffered at the experiment station in a dry time on wettest ground because there was a white water sand under some portion of the ground and the feeders were cut off just as soon as they got to that water sand. That is not a favorable location for orchard soil. But there are fine spots that one might want in a field which might contain springy places—that I would drain—I would not stop putting out an orchard in that location, but just drain it.

Mr. Hutchins—I just wanted to inquire if this matter of using dynamite in orchards does not apply more particularly to the old neglected orchards?

President Farrand—I don't know how food can get in there if the old trees are all right, that is the last place you want to put a stick of dynamite.

A Member—Do you bank up young orchards in the winter? With me the banking did more damage than the mice.

President Farrand—I haven't found any bad effects where mice and rabbits worked.

A Member—I have practiced banking for the mice and find that it saved my trees instead of making it worse.

Mr. Morrell—The best way to keep these hollows—get your tree down low enough. I have about 5,000 trees that are from three to eight years old, some about ten years old—well, I let the heads grow up high, then I was always troubled with hollows filling with water. When I practiced cutting them low the hollows didn't appear.

Mr. Bristol—The ground has been so soft that we have had springs where we didn't have any before—so hollows were made without any effort.

Question—Is that cellar-covered stock?

Mr. Morrell—I will say no. I never saw good cellar stock except it was heeled in in the cellar. I do not believe there is any way to do this and have it successful except to heel in as soon as taken out of the ground. I have seen this tried so many times that, without going into detail, I should say, decidedly, no.

President Farrand—In this connection it would be well to have a reply to Question 21, "What nursery stock can be successfully set out in the fall?"

Mr. Rowe—The sweet cherry is the only tree fruit that can be universally set out in the fall successfully, that is, where it is better in the fall than in the spring.

A Member—I have set out over 100 acres of peach orchard in the fall and I mounded them clear up into the limbs. By doing this the first growth starts where it will begin to grow right. This makes lots of trouble but I never got anything like as satisfactory results the other way.

Mr. Rowe—Was this in Michigan?

Answer—Yes, sir.

Mr. Rowe—I was aware that that was practiced in some of the western states, but I did not know that it was in Michigan.

Mr. Morrell—I never strip a tree of mine—a tree that is stripped is not as good as a general thing.

A Member—Is it possible for nurserymen to mulch trees and keep the roots in good condition, either in the cellar or out of the cellar?

Answer—I am not smart enough to keep the trees mulched up, but spread my dirt well up into the limbs, layer after layer.

A Member—I think that is the correct way. A short time ago I went to a nursery for some stock and when I was told to take some Hubbards-ton trees out of a certain bunch, I happened to notice that the roots were dry and I told the nurseryman that those trees would not live. Now, what about the other fellow who gets the inside?

Mr. Farrand—Many of our losses are no doubt due to poor storage of trees in their packing. I have seen shipments where the roots were bare and all dried up, yet they were delivered as though they were all right.

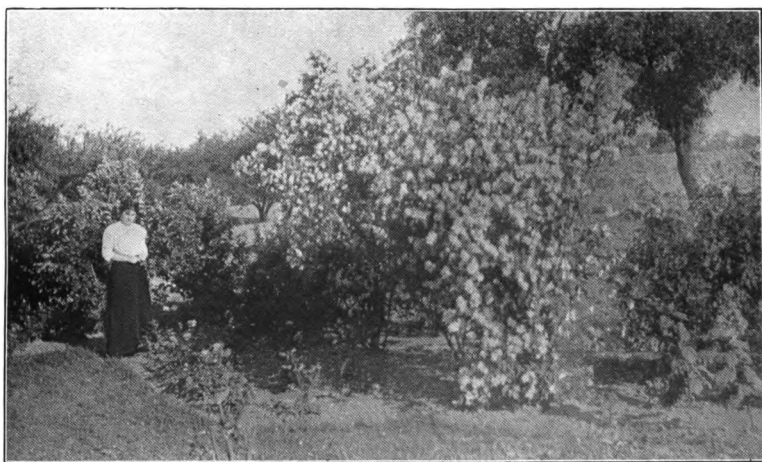
Mr. Morrell—There has been a sort of ignoring in all of this discussion of the difference in the different fruits. We have been talking about the treatment of peach orchards, while the treatment and habit of growth of the apple is so much different from the growth of the peach that I fear we may get a little confused. A peach needs a surface soil up to the place where the rootlets will get light, but this is not understood by some. The matter of the proper needs of root growth and the proper soil necessary to secure the best results is the least understood of any section of horticulture, and it is one of the most important. Above the ground is much easier handled than that below. For a number of years I was agent for a powder company and sold dynamite for the purpose we have been talking here, but one thing I can tell you, if you use it on wet, hard land, clay, it packs the soil under the shot just like a kettle, and it will hold water just the same. Making a hole in the clay soil would loosen the dirt if you had a wet season. I have used it breaking down dirt in railroads. I had an experience in subsoiling in 1892 for pears. I plowed eight or nine inches deep with three horses, then put four horses on a subsoiler on good tile-drained clay. It began to rain and rained until the 8th day of July, and those trees barely lived, some of them did not live, and when we took them up they were rotten from the lower end to one-half and two-thirds of the distance to the top, because the soil being stirred up so deep, it simply held the water to a dangerous extent. I have therefore come to the conclusion that eight or nine inches of preparation is about all that we want. We used to think the other way was the thing, but our experience just narrated has made us careful about that. If we can turn under a good, prepared clover sod, and then grow some crop on the soil to make it pay its way two or three years, I think you have done all you can.

A Member—Mr. Morrell has just hinted at a matter that I wanted to say a word on and Mr. Ladd also mentioned the matter and that is, recently I attended a meeting where one of the leading speakers in an address stated that people were planting so many orchards that there would not be people to care for them. He claimed that to pay from \$75 to \$125 per acre for land on which to plant an orchard was a great mistake, especially if you did not have plenty of capital and labor to care for it. I did not like to say anything there at the time, but my own experience does not bear out this warning, for with the proper cultivation and care my 1,000 acres of orchard has paid, and more than paid for the growing of the orchard until it comes into bearing. So I say that no young man need be afraid of setting out an orchard, if he has anything like a good location, for he can make it pay its way as he goes along.

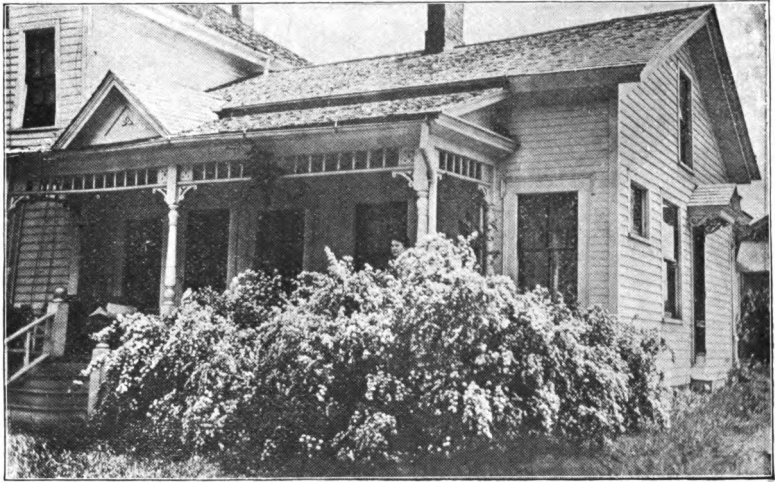
Mr. Rose—I had a little experience last spring in regard to this. I wish you people could look at these trees I have in mind, especially cherry trees. I ran out of trees and I had to buy 250 to finish the orchard. Not over two-thirds of them lived and not more than two-thirds of those that did live made half the growth that they should. These trees were wintered in one of the cellars in Indiana. Now, the fact is, the moment the tree is put in the cellar from mother earth its vitality begins to decrease. I would never buy cherry trees that were wintered. I also had trouble with peach trees, but I did not mound them as high as Mr. Morrell. There are different views on this subject



Border planting for lawn. The material is all native—Linden, wild rose, sumac, red dogwood and elderberries. Munson home, north of Grand Rapids.



Syringas and Honeysuckle bushes, a good border planting for lawns. Roses in front and taller growing shrubs as a background. Home grounds of Mr. Munson, north of Grand Rapids.



Spiraea planting in front of porch is sometimes desirable. (Munson country home north of Grand Rapids.)



Gooseberries and Cherries from the Munson farm, north of Grand Rapids. This double-decked fruit wagon, built about 1882, was probably the first one of that type.

and the thing we want to do is to get them all and then take the one that seems to best suit our conditions.

Mr. Morrell—In regard to mounding only partially and setting peach trees in the fall losing vitality—the tree should be banked as high as you expect to see that tree grow the next year. A tree mounded half way up will be protected and this mounding can be taken down sometime when the wind is in the south and not from the north. You want it to dry off in a mild time, then it will go right along.

Mr. King—I have enjoyed Mr. Morrell's talks—they come from a practical man—but it takes time and labor, too, to set that orchard and what if you do not have the time to do it in the fall and attend to your other work—we must sometimes be governed by circumstances.

President Farrand—That must be done as you can—it is a matter of your circumstance. I had thought that nursery stock should be put in in the fall—at least our method of taking care of our nursery stock is pretty nearly the same as mounding—we lay them down in some sheltered spot and many times in the winter are completely covered with snow and were right along in rows, one on top of the other, and the dirt thrown over them, but the dirt comes nearly up to the tops of the trees. If you get trees in that way there is no reason why you should not have good results. But, as Mr. Rose says, when stored in cellars is where the trouble comes.

Mr. Morrell—This is a question of detail. In heeling in trees I leave on all tops. When you heel in you furnish a harbor for mice. I have found that the best way is to heel them in with evergreen, for mice will not get into this to work.

Question—At what time would you take these trees out of the nursery?

President Farrand—I would dig them in October.

Mr. Morton—What is the object of taking up the tree in the fall and planting it again in the spring, when it would remain just as well in its natural position?

Mr. Morrell—The peach tree is liable to be killed, but the apple and the pear I would not take up until spring.

A Member—I would like to know whether the roots of the trees on that knoll went down how far?

Answer—They had gone down fifteen or twenty feet and the roots were still there, I do not know how much farther they went.

A Member—Why not plant on the sod?

Mr. Bristol—I do not know but you have me stuck. It would make some difference what the site was and what had been on there before. In the first place you should have it pretty well fertilized, in every particular point of ground, and see that there are no weeds or Canada thistles growing there before I set out the trees.

A Member—Weeds are quite a good cover crop, better than no cover crop at all, we usually get rid of the cover crop.

Mr. Bristol—Well, I think myself that weeds make a pretty good cover crop but on the soil that I am growing an orchard on the weeds would be shoulder high by the first of the year.

MY METHOD OF PRUNING.

PAUL ROSE, SOUTH FRANKFORT.

It seems to me that for me to stand up here and give you an address on pruning or tell you how I prune in my orchards is a little out of place, for you are all fruit growers here and you understand the method of pruning as well as I do, but I will do the best I can and perhaps some suggestions or thoughts may be brought out that will help some one.

Possibly I better say the way I prune is to trust the hired man to do it. But this is not always very satisfactory. I had thirty men working in an orchard. They were all over it, one day I went into the orchard, and looking at a piece of work one of them had done, I said, "This is not the way to prune—why did you leave that great knob on that cherry tree like that?" His reply was, "I wanted to have a place to hang baskets for cherries." Well, I just started those men out to do their work all over again and do it right.

Now, in something like Bible phraseology, there is a place to prune and there is a place not to prune. Now, starting with a little tree, which you get from the nursery. I believe in heeling in every tree, just as Mr. Morrell has described. Take no chances. But before I do this, I begin to prune that tree. I do not always do this but I do whenever I have the time. The better way is to take that tree and trim it just as you want it when you plant it, both the roots and the top. You want this done right where the sap circulates between the wood and the bark, there is where the rootlets are formed. If you do that in the fall, just as soon as you set it out in the spring, then the work begins, but if you wait until spring before doing this, there is more or less delay in this respect.

If the tree is a peach you trim to a whip or leave very few limbs. In this cutworm country we want to leave a surface for buds—band the trees and put tanglefoot on. I generally, however, have my soil so prepared that there are no cut worms, but many of my neighbors have lost trees by this way.

What will we do next with that little tree? If you have the time then go through and cultivate, and you can in a manner, form the top of that tree the first season. You can break off these little limbs growing where they should not grow and throw the growth where it should be. Sometimes that tree will grow two or three limbs on the northwest or northeast side, while the opposite side there are no limbs—cut these off, at least the larger ones. Then the second year, these trees can be shaped up, cutting out everything except about three branches. They form the limbs and head that must carry the load in after years. In windy sections it is very hard to grow a tree of uniform size.

In the cherries I prefer to set out a tree two years old—I have tried one-year-old trees but they did not do so well, either the sweet or the sour cherry.

There is one variety of cherry, the Lambert, the best late black sweet cherry that I have raised—that tree is inclined to grow forky—you must

watch that tree—when you cut off this branch, be careful in your selection, and plan to see that the lateral buds of limbs grow evenly. A man cannot spend his time any better than watching the growth of his trees, taking out the growth that is where it should not be.

The plum is a tree that will grow almost of itself, so also the pear. It is almost impossible to prune an orchard of pears, especially Clapp's Favorite, until two or three years, but head in. I do not believe in heading in trees as most people—a tree that has made a heavy growth, you cut back three-fourths of the way, then you have a heavy cluster of limbs coming out there and growing across the middle. I cut back every year and as the tree grows, later cut back more. At the same time these trees have to be watched with regard to getting too many limbs, especially when you are heading back.

I am planting orchards twenty-five to thirty feet apart. I would not advocate planting Elberta peaches less than thirty feet. Give them a chance to get light, air and plant food. In apple growing it is a little different. Apples do not grow so rapidly. I do not grow apples to a very large extent. I have some Wealthys in an old orchard and cut out the limbs, but it is better to take out a lot of the small limbs first. Some men have ruined their orchards by sawing off their big limbs—you should always trim so as to have the center protected.

The sweet cherry is a tree that will respond more to pruning than any other fruit that we have. I have found that systematic and severe pruning so that the air and sunlight can get through will give much better fruit and more of it and this is what brings a reputation to a man. Then there are some varieties that are inclined to shoot right up, all go to top, especially the Early Purple Queen, that need to have the whole top taken out, and in some instances we have had to do this twice. Do not take the limb down in the crotch, for it will give you a rotten heart. The body of the tree must be taken care of or it will break down on you. We have had considerable trouble with certain varieties breaking or splitting down on us, and for this reason many make a mistake in pruning because they do not know the habits of the trees.

I would like to say a word to the young men who are about to start an orchard. Go miles, if necessary, to see the man who has made a success of his business. I have always been willing to give all the knowledge I can, and I believe that any successful fruit grower will do the same to an honest inquirer after information that will help him to succeed. And this applies to information of all kinds, pruning, spraying, the kind of fruit best suited for a given locality, etc.

A word more on pruning. Some trees, like the Gold Drop peach, you have to prune pretty severely in order to get good fruit. But you would not prune that tree as you would the Elberta—the bearing surface must be reduced, because this pruning saves thinning.

I hear of certain varieties that do not bear well. We have in our vicinity a trouble, that they all over-bear, especially the Elberta, in such case pruning is one of the things that we should bear in mind and I prefer to prune in the spring, though the pruning can be done in the fall. Now, if there are any questions I will be glad to answer them to the best of my ability.

DISCUSSION.

A Member—How tall do you form the top of your tree?

Mr. Rose—That is owing to how you are situated. If the tree is in a valley, where the snow is heavy, I prune a little higher than on a hill. I like to have the head of a tree not over eighteen inches from the ground.

Mr. Farrand—What about the height of an apple orchard?

Mr. Rose—The low-headed tree is best. There is no reason why we should drive a wagon through an orchard under the trees. It costs dollars to climb ladders. I have a great many trees that are headed low—I would prefer them to be not over sixteen to eighteen inches from the ground. I believe it is a mistake to do otherwise. I would head the tree right down to the ground.

A Member—What about cherries? I have a Windsor cherry orchard, twelve or fifteen years old, planted sixteen feet apart, but they are now very much crowded. There are limbs two or three inches through—would there be any danger of cutting these big limbs out?

Mr. Rose—No, sir. I have the same thing and I would cut them all off and trim back the tops. It costs money to climb these trees.

A Member—How high a step ladder should be used in harvesting peach trees?

Mr. Rose—Your trees ought not to be so high but what a six-foot ladder would be long enough—there is no need of growing trees so high.

A Member—Regarding the peach trees that have been pruned too high that were set last spring and the limbs have come out—will it form a new top if you cut it off?

Mr. Rose—No, it won't form a new top—the peach will not.

A Member—How do you trim sour cherries?

Mr. Rose—How old are your cherries?

A Member—Four or five years old.

Mr. Rose—You must go in there and make a general thinning out—take out the cross-limbs so the light and air can get through.

A Member—I have an old orchard with low heading, some so low that we have to get on our knees to get the apples on the under side. Now, in planting an orchard of one thousand trees we find that the trees we got from the nursery have their limbs all on top. How are we to get them down to the ground?

Mr. Rose—You cannot do that with two-year-olds, but with one-year-olds it is all right.

A Member—We set out an orchard which is now three years old and half of that orchard had the limbs clear down to the ground when set out. We ordered these trees from the nursery not to be trimmed when delivered. They were glad to do this. And in this connection I may diverge and say a word about what Mr. Rose referred to, the cut worm that many are troubled with. The cut worm is very easy to control. The worm works early in the spring, shortly after planting time. Get a little bran and mix enough molasses to sweeten the bran and then add enough Paris green to color it well, then walk through your orchard and put a handful around the butt of each tree and you will have no trouble with cutworms.

A Member—I have had some trouble with these, both with fruit trees

and with certain vegetables. I use this same formula, but my pocket-book got thin buying bran, so I mixed fine sawdust with molasses and arsenic and I got the same satisfactory results.

A Member—What about the birds, will you not kill them?

A Member—Not if you use sawdust.

A Member—There is a gentleman up in our country who was through my orchard about three years ago and it had made a good thrifty growth. Some of the limbs had made such a growth that it caused the trees to swing back and forth. This gentleman advised me to cut these limbs back. I cut them back for two years. They threw out a good growth of limbs, but they shot out there from eighteen inches to three feet, and some four feet. Last year I cut them back to just short stumps, so as to make as low headed trees as possible. A neighbor told me that this summer that if I would follow this up for two or three years they will stop coming and now I wonder if doing this will be of any injury to the tree?

Mr. Rose—I know it does not hurt the peach tree or the cherry tree—I have not had any experience with the apple.

A Member—This is an apple tree. And I would like to ask if it is not a fact that these limbs, unless they should be center limbs, will open out and spread out without being cut out?

Mr. Bristol—I took an orchard that had never been touched and the trees headed themselves clear to the ground, so that the sheep and hogs even had difficulty in getting around under the trees. I went through it with a saw and made it look different.

Mr. Farrand—Just a word about low-headed trees. The tree that we get from the nursery we sometimes think too high-headed—I had to take trees like that when I set my orchard nine years ago, but now these trees are down within a foot of the ground. Do not worry about these trees that are too high headed, they will come down to the ground all right.

Question—Did you head them back?

Mr. Farrand—I headed in all my main branches.

Question—After that will they have their own way?

Mr. Farrand—Five years ago when I left the experiment station and went back to my own orchard I did not think it had been pruned enough. We had been in the habit of doing pretty heavy pruning, and this I did, and when we got through there was plenty of chance for sunlight. I did this on all except three rows of McIntosh Red. These trees that were pruned made good, strong growth, and yielded well. Now I am going to prune these trees, for if I had treated all my orchard alike I would have been \$500 better off.

Question—In planting another orchard, would you do the same way?

Mr. Farrand—After the third year I would leave it for three years. I am of the opinion that we prune too heavy to get the first crops early.

A Member—I think Mr. Rose struck the keynote on pruning when he says you must consider the character of your tree. There are hardly two apple trees that require just the same treatment—that should be pruned just the same. The Northern Spy should not be headed in so low as some other trees. When you have the forks so near the fulcrum there is danger of splitting, especially in trees that have a willow growth.

A Member—It has been my experience with the apple tree that it is

more trouble to keep them off the ground than to get them up. My young apple trees are headed two and one-half feet and I do not want them placed any nearer than that. With peaches that is another proposition.

A Member—How about the Greening apple—they always come down—how can they be kept up?

Answer—But the Rhode Island Greening will hold its fruit up, with only occasionally an exception to the rule. The Northern Spy will come to bearing in fourteen years and from that time on it will meet you over half way. On the old homestead there is a Northern Spy sixty-eight years old and it is just in its prime. I count it worth \$300. I can pick one-third of that fruit standing on the ground and all of it with a twenty-four-foot ladder. It looks as though it would last for many years to come.

A Member—I was mighty glad this year to have some of my trees close to the ground. I was not able to thin them properly and they had to get to the ground some way. The limbs clear up on the top had to come down while those near the ground that lay on the ground were all right. I had rather have a few bushels on the ground than break the limbs.

A Member—"You pays your money and takes your choice." I never saw any two orchards pruned just alike. I have no quarrel with the one where his trees are grown to the ground, neither with the one who has to use a twenty-four-foot ladder to gather the fruit. I am perfectly willing that they grow the fruit where they want to. But in all these operations you must have a hired man to contend with. Sometimes he does as you want him to, but three or four times to that once, he don't. They are usually just about as heedless with the whiffletrees and harness as those fellows with a saw. If they run up against a limb and break it down it is all the same. Do and say what you may, the majority of them will do you in one way or another. But when we get one that is careful, that really takes an interest in the work, that you feel you can trust to do as he is told, he is such a rare jewel that you will retain him at almost any cost.

As a matter of interest in our heavier ground we are obliged to get the limbs up somewhere so that the teams do not brush too hard on them, and as a concession to the hired man, for I have heard some hired men say, "I want to see your orchard before I make a bargain."

Another thing is the distance apart that you keep the limbs. If you are going to grow these highly colored apples you must do it by allowing the sunshine to reach them. It is the light very largely that gives the high colored fruit. Fruit does not properly class as No. 1 unless it is high colored. Apples grown in the shade are less highly colored, so if you want fruit that will rank at the top, you must keep your trees pretty well thinned out. On the other hand, too much thinning, especially in some localities, is liable to give you sun scald. This must be looked after and considered when doing your trimming.

A Member—Twenty years ago there was an old fruit tree agent I knew that advocated the idea that if you start a trunk down about twelve inches from the ground, that the limbs from that point will grow upright and these trimmed up will make them all stand upright and will carry a load—better than on a tall tree. With low trunks one can work closer to his trees than on the old orchards where the trunks are trimmed up high and where the limbs are out.

Mr. Rowe—I think these discussions are very profitable. In going over the fruit section of the several states I have visited I find that there is no one man that seems to excel in everything, but here and there you will find a man that is pre-eminently at the top along one particular line. For example, the best pruner, the man who has the best pruned orchard so that he doesn't have to use props, and the best pruner of a peach orchard without any doubt is Horace Sessions. He has a special system of pruning and it is an ideal system and yet Mr. Sessions is terribly bothered with borers at the butt of his trees, so you see that while he excels in one thing he has trouble in another direction. Then there is another man who excels in his ability to handle men and his workmen always stay with him and give the best of service. They will work until midnight if necessary. You never see a broken limb, an injured tree and the cultivation is the most thorough, and yet this man has difficulties that other men have entirely surmounted, so I say we get lots of good out of going and visiting personally the orchards of men who have made a success in various directions and, especially, who have made a success along lines in which we ourselves have not succeeded so well. It is worth any man's time and money to go and visit Paul Rose and watch how he handles his trees and fruit. No man can fail to be benefited who visits Horace Sessions and learns from him his method of pruning and so my suggestions would be that you take every opportunity you can to become familiar with particular lines of work from men who have made a good success of the work.

President Farrand—This discussion has been carried along to quite an extent and as the hour is getting late I think we had better draw it to a close. If there is nothing further the meeting will stand adjourned until the banquet this evening.

ANNUAL BANQUET.

Every year's meeting of the State Horticultural Society has for its social feature the banquet which is attended by practically all the members present, as well as others. It is a time that is looked forward to with anticipation, not only because of the bountiful repast served and the pleasant associations enjoyed, but for the afterpart, when the toasts and responses are enlivened by sallies of wit and humor and repartee as well as words of wisdom which come from those assigned places on the program. For, be it known, that among the members of the State Horticultural Society of Michigan are speakers who would grace the festive board of any banquet, and whose eloquence would measure well with that of speakers from more pretentious professions chosen to entertain on occasions like this.

The banquet was in the spacious dining room of the Stearns Hotel, and was crowded to its utmost capacity in order to accommodate those present. The supper was in keeping with the character of the hotel and the dining room was gaily decorated for the occasion. At the appointed hour the large crowd sat down amid the strains of music furnished by the orchestra. The menu was as follows:

MENU.

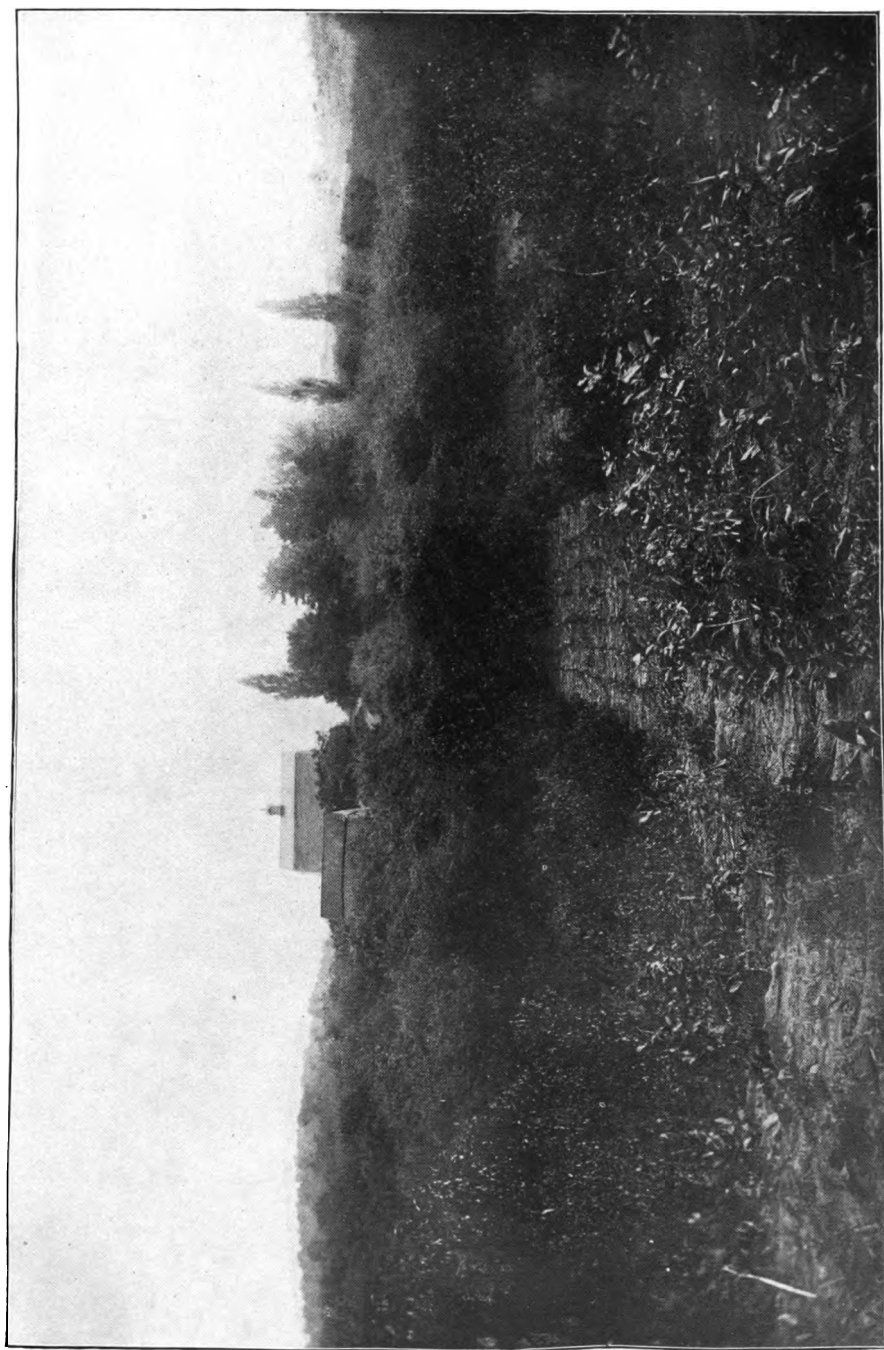
Pottage a la Printaniere.	
Long Island Wafers.	
Olives.	Sweet Pickles.
Fricassee of Chicken on Toast.	
Whipped Potatoes.	Sweet Peas.
Cabbage Salad.	
Candy Wafers.	
Vanilla Ice Cream.	Assorted Cakes.
Cafe Noir.	Rusks.

The repast being over President Farrand called the people to order with these words:

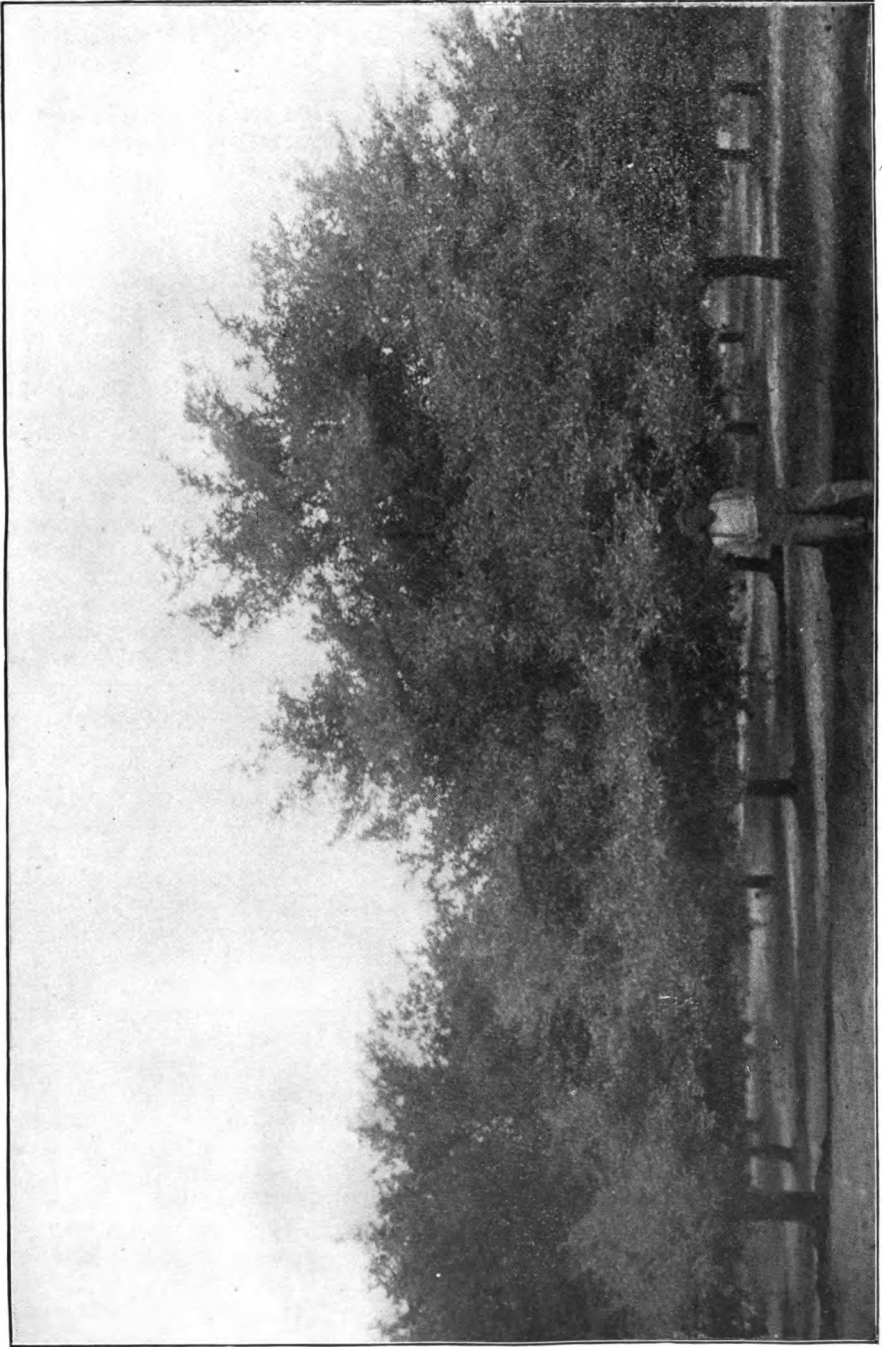
Ladies and Gentlemen, Friends, Members of the State Horticultural Society—At this, the closing session of the day, we think that every member of this society present can feel to congratulate himself, for while what we have had is good, the best is yet to come. There is nothing that could add more to the finishing touches of this splendid day's work than the pleasure I take in introducing to you as our toastmaster, Mr. George E. Rowe, of Grand Rapids.

Mr. Rowe, in introducing Judge Duell, the first speaker, told of a lecture he recently listened to by a man known over all the United States as one of the greatest pulpit orators of the age. He was talking about his travels and especially dwelt upon his trip through California and the wonderful feats of Mr. Burbank, but during all the fifteen minutes devoted to him not one word that he said of him and his accomplishments was true. The speaker had simply gathered from newspaper reports and hearsay material that with an excellent imagination he had woven into a fine story and was telling it to vast audiences but the story was not true, and if he had had any practical knowledge of what he was talking about he would have known that it was not so. "The time has come," said Mr. Rowe, when we want definite information about things. The truth is none too good. We want to hear on subjects of interest to us from men who absolutely know what they are talking about and have really seen the things they are describing. I have great pleasure in introducing to you my friend, Judge Duell, of Harbor Springs, who is going to talk about the Grand Traverse region, and he will tell you nothing that he does not know for he has lived there.

The judge then took the floor and indulged in a few complimentary remarks concerning the work of the society, the town with its improvements, but which in one respect had not changed in twenty years, since he was last there—"the mud is just as deep now as it was then. (Laughter.) Otherwise, the city has improved wonderfully." He paid a high compliment to the ladies present and then launched into his subject and for fifteen minutes laid before his audience facts and figures as to the population, resources and future possibilities of this great region almost bewildering, so that one unfamiliar with it could hardly fail to be almost amazed of what was in the future for this broad stretch of country. He closed with a most earnest appeal for civic righteousness, declaring that the greatest good would never come to us as a people until each citizen in his place did his best to bring about that state of perfection where the utmost, by proper methods, is brought forth from



Home farm of A. P. Gray on the noted peninsula, north of Traverse City, one of the most successful cherry growing sections in the world.



Baldwins grafted on Kussets on farm of A. P. Gray, Grand Traverse County.

the soil, and then the wilderness is made to blossom like the rose. "This audience here tonight," said the speaker, "the representative farmers throughout the length and breadth of this State, can do more for the boys and girls in our schoolhouses to give them high ideals of life than any one else. I am an optimist. Today is better than yesterday. The world is growing better. If not, it is a failure, but I don't believe it, and so I am going to move onward and upward with the inspiration to greater effort which comes from looking on the bright side and living for and expecting great things."

Mr. T. M. Sawyer, editor of the Ludington Record-Appeal, was next introduced and began by saying that he wanted to preach a sermon without any preface or stories on the subject of "The City Man vs. the Farmer," which he took to mean the relationship of the city man to the rural citizen. Ludington, he said, paid forty per cent of the taxes of Mason county. The Department of Agriculture at Washington is maintained at a very large expense in order to teach the man who secures his living from the soil how most profitably and to the best advantage to get it. Any part of the burden of that expense that falls on Mason county as a whole, the city of Ludington bears forty per cent of it. So with the State agricultural school, the maintaining of farmers' institutes, experiment stations, the county normal for the training of teachers, etc. This he regarded as an unequal taxation without proper representation or compensation. "As farmers, your trade that should come to this city is much of it diverted in other channels, because of a fancied idea that you can gain a little financially," which is not rendering to Caesar his own. But there is still beyond the commercial side of the question another phase, infinitely more important. In all this sad, mad rush for wealth and place and power, men are homesick—longing for home. They seek simplicity, and the country calls them, and they fain would go back to nature and lay their tired heads in her lap. Will the spirit of brotherhood prevail? We go this way but once, and we do well to help one another while we may, and as we journey the road over which we pass but the once, may we go hand in hand. (Applause.)

Mr. Rowe—One of the hopeful signs of the times horticulturally are the magnificent young men that are today taking up the scientific study of horticulture in our agricultural colleges, not alone in Michigan, but in nearly all the states of the Union. The classes are larger than ever before. We have a splendid class in our own college and I take pleasure in calling on a member of that class to say a few words to us at this time, Mr. Geo. B. Branch, a senior of the M. A. C.

Mr. Branch introduced his remarks by telling a little story on Prof. Gunson, which elicited a round of laughter, and then stated that the difficulty with many graduates when they went forth was that they thought they knew a good deal more than they really did, but when they got out among the hard-headed practical farmers and horticulturists, that was soon taken out. He was glad to say that there was at the college at the present time the largest number of agricultural students ever before in attendance who were here to learn the science of agriculture so as to go out and be farmers of the highest type, with the conscientious desire to help to bring the calling up to where every one can say that he is proud to be counted as one of them. He hoped that a much closer union could be made to exist between the practical farmers and fruit

growers and the students than existed. "We need the practical side of this training and we want you to give us a chance to come where you are and work with you. Please do not be prejudiced against college students for there is nothing that will give us boys more joy in our future experience than to look back to the time when you took us in and helped us to make our theoretical knowledge most practical. I want to thank the management of the Michigan State Horticultural Society for giving us a chance to come up here and get acquainted with the fruit growers of the State."

Mr. C. J. Monroe was next introduced and spoke quite at length of his recent trips, especially through the south and of the wonderful possibilities there were in that country. He spoke also of the great advance that had been made in the schools and especially the training of the colored people, and was enthusiastic in his belief that the training they were receiving at such schools as the Tuskegee college would soon place them where they would be able to cope with the many problems that they had to meet.

Prof. Eustace, of the Agricultural college, was the next speaker and gave a very interesting account of his recent visit in the west and of the conditions that existed there in regard to the fruit raised and his observations. His deductions were that there were conditions that existed that were not generally known—the apples raised were good, but they had the same pests to contend with that we did, only more so; they raised big crops, but still every one of these people were willing to sell out. They all wanted to be on the move. The real conditions could not be learned by inquiry. Here it is different—the fruit is just as good, the land not anything nearly so high, the freight rates low, the market close at hand—why not be content to develop and make the most of what we have? That was his feeling after the visit.

Mr. Roland Morrell was introduced as the last speaker who, after a few felicitous remarks said, "It has been ten years since I have met with you before and I cannot tell how I have enjoyed meeting the old boys again and seeing whether they had got away with anything since I have been gone.

There are a few things, however, that are happening throughout the country that has a tendency to give one bad dreams and one of them is the way many newspapers and city writers have of getting the other fellow back to the country. Promotion schemers induce stenographers, clerks, kitchen girls, anyone who can pay from \$2 to \$5 a month on a few acres of land out in the country that are grafts pure and simple. Some of these schemes are right here in Michigan as well as in other states. This detestable practice, these swindling operations should be given all the publicity possible, for it will mean only disappointment and failure in the end to a great majority of the investors. Of course, there are isolated cases that are different, but I want to raise my voice against the advantage that is being taken by dishonest promoters of the "back to the soil" movement to impose on innocent and unsuspecting young people who part with their hard earned money to find in the end that they have been swindled.

Well, I am glad to be with you and I want to say to these young men that there is in the highest culture of the soil a range of study sufficient for any young man and I believe that as much money can be made from

it as from any legitimate business. And if you will only dig you will wear diamonds in the end.

CONTROLLING FRUIT DISEASES.

EDWARD HUTCHINS, FENNVILLE.

Members of the State Horticultural Society—I want to congratulate you on having these various pests and diseases to combat. I do not know whether you will appreciate the congratulations or not, but did it ever occur to you that if we did not have any difficulties to contend with, if all that was necessary to do in order to grow fruit was to plant the trees and in a short time go and pull fruit off, it would not be worth the pulling off? One speaker yesterday morning, if I remember correctly, said that last season there were one hundred thousand trees planted in Mason county. I wonder how many of these trees will ever come to bearing age? If all the trees the nurseries sold were all right and continued to bear, the orchards would be so numerous there would be nothing in the fruit business, whatever. It is with fruit growing as with everything else, where we have to contend with difficulties, if we rise above them and surmount the obstacles we bring success out of what would otherwise be failure. Science has discovered that the people in the torrid zone where with little efforts all that they may require is produced, and all that they have to do is to reach out their hands and take what is necessary to supply their needs, never amount to anything. In the frigid zone where the struggle is more than a man can surmount, there also he fails to reach the highest development in point of civilization, but that is not the subject I am to discuss.

As I look into your faces the thought comes to me, I wonder how many there are here who are actually troubled with diseases of trees? And how many have overcome these difficulties? (No response.) Well, perhaps I am out of place with that question. Now, I would like to ask you how many of you have the yellows?

A voice—More of us have the “blues.”

You cannot be in this meeting very long before you will get over the blues at least.

There are some diseases of orchard trees which may be controlled by means of spraying or the removal of the affected parts. Fungous attacks, such as scab, rots, mildews, etc., respond to treatment and blights, canker, black knot and diseases of this nature may be successfully combatted by cutting away the diseased portions. Of such ailments it is unnecessary for me to speak at this time. The bulletins of the experiment stations give minute and explicit directions for the treatment of all of these. These publications are in convenient form for preservation and may be had for the asking.

There are two diseases which attack the peach, however, concerning which there is considerable complaint in various parts of Michigan which do not surrender to any known treatment save the axe and the match. These are the yellows and the little peach. While there is nothing new

respecting these diseases, yet some observations gained from a long and painful experience may not be without interest or profit.

Twenty years ago the peach yellows was especially virulent in parts of southwestern Michigan, not only wiping out whole orchards, but in instances taking all of the peach trees in whole townships. Yet while this is true there are districts in that territory which have continued to grow peaches, and, except for the severe freeze of half a dozen years ago, southwestern Michigan would now no doubt be growing peaches in as large quantities as ever. In spite of all its untoward vicissitudes that section still markets large quantities of this luscious fruit. The yellows may be said to be virtually eradicated. Nobody there in the strictly peach-growing sections fears it. In the last ten years I have not seen ten cases of it. But in places where people have not yet learned the lesson of vigilance the losses caused by yellows is large.

With the little peach the progress in the work of extermination has not been so salutary. First making its appearance some twenty years ago the experience of growers with the yellows led them to wage war on this disease as well, but the fight has not terminated in the same successful issue, for it is still with us, and in some instances to an extent to cause some apprehension. Like the yellows it seems to be more virulent in some years than in others, and the past season seems to have been one of the unfortunate ones. The fact of its continuance is doubtless due to the obscure nature of its symptoms. It is not so readily detected as the yellows and so is probably overlooked in many cases, thus allowing the spread of the contagion.

That it is possible to hold the little peach disease under complete control has been demonstrated. A few years ago Prof. M. B. Waite of the United States Department of Agriculture, undertook the work of eradication in co-operation with the local yellows commissioners and peach growers, in four or five sections of Saugatuck township, Allegan county. The territory selected was fairly well isolated from other orchards and so was comparatively free from outside infection. Every orchard in this district was visited once a month during the time when the disease was apparent and every diseased tree found was promptly removed and destroyed. This work was continued three years, I think, and the result at the time appeared to be complete extermination. But the disease has since made its appearance in these orchards, whether from infection still existing or from outside sources is not known. Quite possibly it may be from the latter. But in orchards where ordinary vigilance in its removal is employed it is not present to an extent that is at all alarming.

In spite of the fact that the only known means of controlling these diseases is in the prompt removal and destruction of every affected tree, there are still a number of questions arising respecting them which engage the attention of growers. What is the origin and nature of these maladies?

Can vacancies be safely refilled?

Is there not grave danger of introducing the disease through nursery stock by means of pits or buds from infected trees?

Must we go out of the peach business?

These and other things are matters of vital importance to peach growers.

The only suggestion respecting the origin of the yellows we have seen is that given in the Year Book of the United States Department of Agriculture for the year 1898, by William Saunders, then horticulturist of the department. He says:

"The action of sudden freezing of immature and imperfectly ripened wood in the fall or early winter is a fruitful source of disease. That apparently incurable malady in plants known as 'yellows,' in the opinion of the writer, based on forty years' experience, is the result of sap contamination of these frozen points, the prompt removal of which will, he is convinced, prevent the spread of the disease, and thus save the plants from speedy and ultimate destruction."

While this may account for its origin it is evident that frozen wood is not the only means by which the disease spreads. While nothing is known regarding the nature of these diseases and the method by which they extend, it is reasonable to suppose that when they appear in a region remote from where they have been found before, they are brought in upon infected nursery stock. I am convinced that the danger from this source is small, however. I never have seen either of these diseases in trees that have been planted in the orchard less than three years, though some have told me they have seen the yellows on younger trees than this. Careful experiments by Dr. Erwin F. Smith of the United States Department of Agriculture and others have shown that pits from premature peaches will not grow, and that buds taken from the apparently healthy part of a tree showing the yellows on one side either make no growth at all or show the disease within a very short time. It seems reasonable to conclude, therefore, that nursery trees that may be infected in either of these ways will show the disease before they are ready to put upon the market. But there is a probability that trees growing in the nursery may be infected from diseased trees growing in the vicinity. There will always be danger from this source where trees are obtained in sections where yellows prevails. With respect to the spread of the little peach by either of these means nothing has been shown by experiment so far as I am aware, we can only conclude from analogy that similar conditions exist.

With respect to the spread of these diseases it seems that their progress from place to place is comparatively slow. An orchard three years under my care, adjoining a township in which no yellows commissioners had been appointed, twenty years ago went out entirely with the yellows and the trees on an adjacent farm suffered badly, while an orchard two and one-half miles away at the same time did not have one per cent of the trees affected in any year. It was observable, too, that when the malady was most prevalent occasionally a grower neglected to remove his diseased trees promptly, didn't think it was "catchin'," some being so negligent in this respect that arrests were made under the yellows law. These men invariably lost their orchards in a short time, and their immediate neighbors suffered severely, but in orchards a mile or two away there was no appreciable increase in the number of diseased trees.

Where either of these diseases exists to any considerable extent it is doubtless unwise to plant new orchards in the immediate vicinity for a few years, until the number of affected trees is reduced to a minimum, but experience abundantly shows that in Michigan vacancies caused by the removal of diseased trees may safely be replanted the following

spring. I have trees now going out with old age that were planted where trees were removed on account of the yellows. One of my finest bearing orchards is now growing where ten years ago the trees were largely taken out with little peach. A few trees are affected each year, but less than one per cent were cut out this last season in this orchard.

If a person is intending to grow peaches there are certain things he must have reference to respecting these maladies. He must first be located in a neighborhood where all appreciate the fact that both are very contagious and where all will unite in promptly destroying every affected tree. Yellows commissioners are not a very certain reliance in holding the diseases in check without the hearty co-operation of all. One man who is careless or indifferent can cause large loss upon his immediate community. A healthy public sentiment will hardly be maintained or encouraged without a corps of efficient and energetic yellows commissioners, however. See that these are appointed in every township where men are presuming to grow peaches. This will help in building up a wholesome public sentiment.

Then every grower should familiarize himself with the characteristic symptoms of both these diseases. The indications of the yellows are quite pronounced and are easily recognized, but those of the little peach are more obscure and may be produced by any one of half a dozen different causes. A severe drouth, or lack of cultivation, or too wet ground, or an injury by harrow or cultivator, or unfavorable conditions of various kinds may any of them produce an appearance in the tree that may be mistaken for the little peach. But it is best to give the orchard the benefit of the doubt and remove every suspected tree when the disease is known to exist in the orchard or the vicinity. It is better to cut out half a dozen sickly trees that do not have the disease than lose several times that number later with the disease because one has been allowed to go over that has it.

To recapitulate, then:

Both yellows and little peach are very contagious and will spread rapidly if allowed to stand, but if promptly removed upon the appearance of the first symptoms may be completely controlled if not entirely exterminated.

There is small danger of introducing the diseases upon nursery stock either from pits or buds from affected trees, as they will probably show the presence of the maladies before the trees are large enough to plant. If neither of the diseases exists in the vicinity of the nursery it is quite safe to plant the trees.

Diseased trees may be removed and young trees again planted in their place without contracting the disease, though I have found that a bushel of rich earth mixed in the soil is an advantage in giving the young tree a good start.

But if they are either of them known to exist it is necessary that all shall unite in combating either of these diseases in order to keep them under control.

Where either yellows or little peach is known to exist eternal vigilance is the price of growing peaches.

DISCUSSION.

President Farrand—The control of fruit growing diseases is one of the greatest things in connection with fruit growing, so let us make use of Mr. Hutchins who comes from a belt where the “yellows” and “little peach” have abounded.

Mr. Wilde—I would like to inquire if Mr. Hutchins thinks it necessary to cut the tree down and destroy it by burning those affected by the yellows, immediately on finding it. I have seen many who have cut them down and left them in the orchard for sometime before burning them—what is his opinion?

Mr. Hutchins—Well, I have no doubt that when men begin to ask that question they begin to get on dangerous ground. Where you see that practiced you usually notice that disease exists. Where people get careless and do not think it necessary to use precaution the disease stays with them. The law requires that the trees shall be cut down and I think it is a pretty safe course to follow.

A Member—The law limits to ten days.

Mr. Hutchins—Two or three days would not do any hurt.

Mr. Wilde—What is your opinion?

Mr. Hutchins—Mr. Wilde wants my individual opinion. I shall not hesitate to give it. The danger is it might allow leeway to someone else. What I might say would be liable to be taken up and an inference drawn that it was not necessary to do anything.

President Farrand—Have you answered that question?

Voice—No.

Mr. Morrell—What do you do, Mr. Hutchins?

Mr. Hutchins—If I have a man that understands the disease I send him around and have him cut the trees down; if I do not have such a man I go and cut them down myself.

Mr. Morrell—Then what?

Mr. Hutchins—I go after them with the horse and snake them all together, build a fire, trim off the limbs, put them on the fire and burn them.

Mr. Morrell—Within five days?

Mr. Hutchins—Not always within five days.

A voice—Do you pull out the roots?

Mr. Hutchins—Yes, sir. Now you asked my opinion and I am not adverse to giving it. I have an idea that when the trees are cut down and the limbs are dry—and they will dry in a few days—that the disease stops there—that is my opinion. However, my opinion is one thing and the law another, I would not advise you to tamper with this disease. You will certainly be safe in cutting them down and burning them, and do it vigilantly and promptly.

A Member—I have heard it said that there was danger in dragging these trees through the orchard.

Mr. Hutchins—That is a matter of opinion. I think my opinion is as good as that of a good many others. Personally, I do not think there is any danger in that respect, but I am frank to say that I do not know positively. I know some people who imagine that they can trace disease through an orchard where these diseased trees have been pulled, and I have never said myself, that it was so, but my opinion is that there is no danger from this source.

A Member—In your experience have you come to the conclusion that there is any special time when these diseases are more contagious, or are they equally so at all times of the year?

Mr. Hutchins—I do not know anything about when the diseases spread; I have no doubt during the growing season sometime, but when, I could not say—I have not the slightest idea; some think they spread in the blossom but trees have it that never blossom.

Question—How do you identify the little peach? I understand from the description of the disease that if the tree fails to mature its peaches that the peaches stay green when the others have ripened—is that an identification of the little peach?

Mr. Hutchins—That is one of the attending symptoms of it. We usually go by the appearance of the foilage, however.

A Member—Is it just as well to cut the tree down as to take it out by the roots?

Answer—We do both.

Question—What reason would you give for supposing that the contagion ceases after the tree has been cut for two or three days?

Mr. Hutchinson—If you would go in August and pluck a roasting ear from a field of corn you would not say that the corn was not good simply because the kernels when put in the ground did not grow? You would say that the trouble is that it was not yet matured, so that when we cut the trees down the disease stays there; we can conclude that it has not reached that stage of maturity where contagion will be spread. I think we may safely conclude that, and this will cover some of those other questions that have been asked. The disease at this stage is not communicated. That is my opinion only, but I think we can safely conclude that that is the case.

A Member—I would like to have question No. 22 answered, which is as follows: What legal protection have we when the neighborhood refuses to spray his scale infested orchard?

Mr. Hutchins—I am not familiar enough with the law so that I can give you its conditions, I know that it compels spraying.

Mr. Wilkins—The law compels spraying but you cannot cut down the trees.

Mr. Morrell—Yes, it has been done.

A Member—It is being practiced in some parts of Allegan county today.

Mr. Hutchins—I was at the institute the past winter and a gentleman was there from the eastern part of the state and tried to get a part of us interested in fruit growing to bring more pressure to bear in having this law more effective.

Mr. Morrell—The law can only be made effective by enforcing it, but to enforce it you must have a public sentiment, because without it, the law will never become operative unless this is the case. But when public sentiment backs it up, then it can be enforced.

President Farrand—There is a remedy for the San Jose scale, you can spray but you cannot cut the trees down.

Mr. Morrell—You can for the yellows.

President Farrand—Yes, that is so. But it must be past the saving stage before the trees can be cut down. There is no remedy for the yellows so the tree affected with it can be cut down.



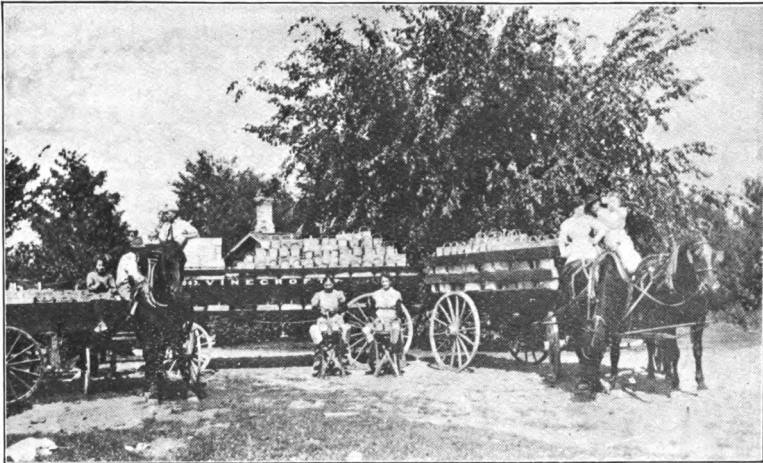
J. C. Johnston, Casco, Allegan County, says that he knows jobs more agreeable than spraying for scale, etc. But—



Johnston also says that you cannot produce many big loads of perfect, bright red apples like this one, without spraying.



Grape Pickers at "Vinecroft" Vineyards of Wm. K. Munson, north of Grand Rapids. Picking and packing is done in the field. The stands as shown are a great convenience.



The grape basket covers are hooked on in the packing shed and wagons loaded immediately for shipment to market.

Mr. Crane—I want to say a word on this disease question. I have been growing peaches for quite a while, thirty-five years, I have been through these various stages of disease and I have always considered the law lame. It is not a practical law for fruit growers. I believe that we want a law to cut the trees down but that you shall burn them up within five days is not practical. I have never seen any community where the public sentiment cannot be made strong enough with us in the peach business, so that the law could not be carried out to the letter. If you want to eradicate the disease cut down the trees. I do not care whether you burn the brush or work it up into wood—take your time for that, cut the trees down, burn them as soon as possible—I am satisfied that the disease will be eradicated. I have seen it tested out many times. I have seen orchards where the commissioner found 500 trees which he cut down on suspicion. Of course, this is a pretty hard thing to do, but there was no disease in the orchard next year. That shows that as soon as the trees are cut, that stops the spread of the disease. We should have a practical law, we should have a law compelling the trees to be cut down, and when it states that you must burn them immediately it is practically an impossibility. He cannot hire hoboos enough to do that. If he cannot live up to the law he might be a little slack.

It is almost dangerous to set an orchard less than a mile or two from any infected orchard, and even then, the chances are against bringing that orchard through and getting even a few crops of fruit from it. If we had a practical law every county in the State of Michigan would eradicate the yellows and the little peach. The commissioner cannot get the men to do the work as the law contemplates, simply because it is not practical. One man could cut down 200 trees a day, but to do the other part is another proposition, certainly the commissioner cannot do it.

Mr. Hutchins—You will be interested in our experience. In the year of 1891, when I went on to that homestead, two years before that, there had been a failure of the fruit crop. There must have been sixty to seventy acres of peach orchard—most too much of a proposition for me. The next year we went through and started to keep up with the disease if possible. We had a man that understood the disease, and we both started in every Monday morning to go through the younger trees up to five or six years old, and put a mark on the affected ones and the third man followed with a good team and pulled out the trees and piled them together and I took an axe and cut down the larger ones. Wednesday noon we finished up and the next Monday morning we repeated the operation and in four weeks by following this systematic plan—two days a week, three men and a team, we were able to get things in pretty good shape. Mr. Crane has a farm adjoining and for a good many years had had the yellows and he continued to get peaches right along, so you can judge whether our work was effective. I do not know that Mr. Crane ever complained about our not being energetic enough, but I think he has said that that thorough work saved his orchard.

Mr. Wilde—I would like to know what you consider is the earliest symptoms of little peach?

Mr. Hutchins—The thing that I usually go by is the appearance of the foliage. The ordinary peach leaf is folded up, but these leaves on

the tree affected with the little peach will be folded or turned right back and will have a yellowish color as though troubled with drought.

A voice—Do you mean wilted?

Mr. Hutchins—No, not wilted, but having a yellowish color.

A Member—Are they not wider and a little shorter?

Mr. Hutchins—No, I do not think that is the case, at least I have not noticed that feature.

A Member—I have some trees that have a yellowish appearance and the leaves appear to be a little wider than natural. A part of these peaches never mature. Some arrive at full size, ripen at the regular time, but others never come to maturity. That we call little peach.

Mr. Hutchins—Did you find no injury on the body of the tree?

Answer—No, sir; not that was noticeable.

A voice—What variety?

Mr. Morrell—Some varieties have that sickly look but not sick at all.

A Member—I believe that the statement was made by Mr. Hutchins that the yellows were not developed under two or three years of age.

Mr. Hutchins—No, sir; I do not think I said that; I simply said I had never seen it in trees under two or three years from planting, but I think it exists in trees two or three years before it reaches that stage of advancement so that the symptoms are evident.

Mr. Hill—I think that trees are not safe from the nursery.

Mr. Hutchins—If these boys who are to follow with their five-minute talks would be willing to surrender all their time I think I could tell you what I know about this matter, or rather what I think I know about it. (Laughter.)

Mr. Marvin—We have been told by a bulletin that it was not safe to plant peach trees back where the trees affected with little peach had been taken out.

Mr. Hutchins—Our practice has been to take the trees out—as they are affected—we cut them down, and as soon as wet get around to it we burn the brush, and then the next year we set the trees in the same place. If you have ground of this character so that roots will run from the outside, to the surrounding trees, you may not have very much success in growing trees in that soil, but where the ground is heavier and the roots do not spread so much, or if the trees are quite a distance apart it will be all right. I have had good success in putting muck in the holes and planting trees in that. The ground must be worked thoroughly. I have trees that are quite old that were planted in the same place where the yellows had been.

A voice—I mean little peach.

Mr. Hutchins—Just the same.

A Member—Is not a good deal of that which is called little peach due to root aphid?

Answer—Yes, we must look out for root aphid.

A Member—How can we tell the difference between root aphid and the yellows?

Mr. Hutchins—In the root aphid the whole length of the twig is affected, the characteristics are different, in the root aphid the leaves are folded more, while in the little peach the peculiar characteristics are, that it is flat or folded back and sickly looking and the ones most affected are those growing down to the base of the twig.

A Member—How do you combat aphids in the dirt?

Mr. Hutchins—I combat by planting in ground that don't grow them, but I think so far as I know, the very best thing to use is good, rich stable manure, some use tobacco dust, but I have not had any good results from using it, others say it has worked well with them. If your peaches grow vigorously, if the growth is forced, for some reason the aphids does not take kindly to this condition and lets the roots alone, that is the most reasonable remedy, but I must confess I have not personally come up against this difficulty to any very great extent.

Mr. Morrell—I have seen splendid results when the trees affected were taken out and the hole filled with rich stable manure in the spring, and then filled in with fresh earth and then plant the trees back in the same place.

President Farrand—This is a very interesting topic and I have been glad to see it so thoroughly discussed, but we have now come to the time when we must give way to the next topic on the program.

ANNUAL BUSINESS MEETING.

Meeting called to order by Vice President Bristol in the chair. The first thing on the program was the report of the treasurer of the Lyons Memorial Fund, which was given by Treasurer Satterlee, as follows:

Report referred to Committee on Finance.

On motion of Secretary Bassett, it was moved that the action of the Executive Board in making it a permanent fund be approved by the Society membership. Carried.

Report of Treasurer Garfield of the Board of Trustees of the Lyon Memorial Fund:

Grand Rapids, Mich., Dec. 4, 1911.

Mr. James Satterlee, Treasurer of the Michigan State Horticultural Society:

Sir—The following is the condition of the Lyon Memorial Fund at this date with the financial transactions for the year:

Cash in bank	\$1,456 15
One Morrill bond	1,000 00
Worden preferred stock	2,000 00
Three greenhouse bonds	1,500 00
Accrued interest on same	45 00
One Detroit gas bond.....	1,000 00
Dykema note	344 96
One Concord bond	500 00
One Savannah Electric Company bond.....	500 00
Horticultural society notes	834 30
Interest accrued (estimated).....	76 71

\$9,257 12

The following are the transactions as shown by our savings bank book :

Cash on hand November 10, 1910 (date of last report).....	\$429 42
November 22. Anderson interest	48 00
December 3. Worden interest	70 00
January 1. Bank interest	6 64
January 4. Morrill coupons	60 00
January 23. Detroit gas interest	25 00
January 23. Drummond bond interest	15 00
January 27. Rent from M. A. C.....	137 50
June 1. Worden interest	70 00
July 1. Bank interest	11 83
August 7. Detroit gas interest	25 00
August 7. Drummond bond interest	15 00
September 23. Bruno Anderson interest	45 00
September 27. Balance Anderson interest	5 60
October 28. Morrill coupon	30 00
October 30. Drummond coupon	15 00
October 30. Investment in bonds	1,000 00
November 3. Rent from M. A. C.....	137 50
November 13. Premium on bonds	8 34
November 21. Drummond bond paid	500 00
November 23. Anderson mortgage paid	700 00
November 23. Interest on same	3 00
December 1. Worden interest	70 00
December 4. Greenhouse coupons	45 00

Leaving in treasury \$1,456 15

You will recall that last year I recommended in my report to you that the Lyon fund should be made even figures, \$7,600, and that the Horticultural Society guarantee notes should be cancelled, which would leave in our treasury, outside of the permanent fund, eighteen cents. I have received no word of any action of the society upon this recommendation and so I renew in this report the suggestion that the society take action making the Lyon fund \$7,600, which would leave in our treasury subject to the draft of the society, \$1,657.12. If we take from this amount the notes and estimated accrued interest, which were given by the society and guaranteed by certain individuals, it would leave in the treasury \$746.11, available for the uses of the society in the prosecution of its work. It seemed to me that it would be wise for the society to take this money and put it in the hands of its treasurer.

I suppose that any accumulation of life membership fund would naturally come into this Lyon memorial fund unless there is some specific action of the executive of the society creating a new life membership fund, I take it, would be glad to have such action taken as would make this situation perfectly clear.

Yours respectfully,

CHAS. W. GARFIELD,
Treasurer Lyon Memorial Fund.

SECRETARY SATTERLEE'S REPORT.

Report of J. Satterlee, Secretary of the Board of Trustees of the Lyon Memorial Fund:

A meeting of the Board of Trustees of the Lyon Memorial Fund was held in the city of Grand Rapids, December 4, 1911, at which were present C. J. Mourse, President; Chas. W. Garfield, Treasurer, and James Satterlee, Secretary.

Treasurer Garfield's financial report to the Treasurer of the State Horticultural Society was read and on motion the recommendations made therein were adopted. The recommendations are as follows:

That the Lyon Memorial Fund be fixed at \$7,600 and that the balance due on the guarantee notes amounting to \$911.01 be retired and cancelled.

In case these recommendations are adopted by the State Society it leaves in the hands of Treasurer Garfield \$746.11.

Secretary Satterlee made the statement that one hundred life members at \$500, if subtracted from the amount reported on hand by Treasurer Garfield would leave a balance to be turned over by him to the treasurer of the State Society of \$246.11. This amount added to the sum reported on hand by Treasurer Satterlee of the State Society would make a total of \$585.64, available for the general expenses of the society.

At a meeting of the Executive Board held in this city last evening it was voted that these recommendations of the Board of Trustees of the Lyon Memorial Fund be adopted and that the \$500 now in the hands of Treasurer Garfield belonging to the life membership fund and that any additions to such life membership fund in future shall be added to the Lyon Memorial Fund to become a permanent addition to such fund to be invested by the Treasurer of the Board of Trustees of that fund.

J. SATTERLEE,

Sec'y Board of Trustees Lyon Memorial Fund.

Ludington, Mich., Dec. 7, 1911.

MEMORANDUM.

This action of the Executive Board was ratified by the State Society and made a part of the records of the business session today.

J. SATTERLEE.

TREASURER'S REPORT.

J. Satterlee, Treasurer, in account with the Michigan State Horticultural Society:

1910.	
Dec. 8.	To balance on hand in City National Bank, Lansing. \$348 31
" 9.	By check to C. J. Monroe for expenses incurred in cementing the graves of T. T. Lyon and wife at South Haven. 17 50
1911.	
Dec. 7.	To C. E. Bassett, 280 annual memberships:
	92 at 50 cents..... \$46 00
	188 at \$1..... 188 00
	<hr/>
	51 life memberships at \$5..... \$234 00
	Fees from auxiliary societies..... 255 00
	61 25
	Co-operative supply deal:
	Gross profits on 1911
	business \$61 12
	Less printing, postage,
	telegram 52 18
	<hr/>
	8 94
	Received on salary from State ap-
	propriation 213 80
	<hr/>
	\$1,121 30
	By C. E. Bassett, salary as secretary \$600 00
	office expenses:
	printing \$35 75
	postage 62 46
	express 3 70
	telegrams 2 25
	telephones 2 35
	<hr/>
	106 51
	expenses while meeting
	with auxiliary so-
	cieties:
	Ionia \$4 85
	Saline 9 75
	Olivet 10 20
	Algonac 11 75
	Berrien county 2 15
	Intermediate Valley.. 13 44
	Grand River Valley.. 2 62
	<hr/>
	54 76
	<hr/>
	\$778 77
Dec. 7.	Balance on hand..... 342 53
	<hr/>
	\$1,121 30

In addition to the above expenses reported by Secretary Bassett he has made a number of other trips to address Michigan local societies and fruit growers' meetings, for which he has paid his own expenses.

Respectfully submitted,

J. SATTERLEE,
Treasurer.

SECRETARY'S REPORT.

We have had two reports, one that of the memorial fund, which is a permanent fund, the income of which is available for our use, but the board cannot touch it just the same as our Lyon fund.

I want to call your attention to the fact that 51 life members are recorded up to December 1, since which time we have added 26 more, so that it shows during this year 77 life members, which is the best record ever made.

Our annual membership is not so great, but you must take into consideration the fact that a large part of our membership is contained in auxiliary societies, so combining the life, the annual and the auxiliary memberships we have a force of about 2,000 members.

During the year I assisted in organizing four local societies, and also addressed fourteen different societies.

We have been receiving a grant from the State, but the Attorney General has ruled that it was unconstitutional to in any way aid any organization that was not purely state—I suppose that means political—but as we do not come under the head of politics, we are ruled out. But my friends, I do not wish anyone to feel that the loss of that appropriation amounts to anything. This loss of \$1,000 simply means that we must work a little harder. We are richer without the appropriation, for the latent enthusiasm and energy that is now dormant to a considerable extent will be brought out and developed. These young men we have on the stage mean far more than the appropriation could mean without them, for we are rich in having such splendid material out of which will come forth educated workers in love with agriculture, fruit-growing, etc. This is most certain.

Another matter I wish to speak of. It was decided at the executive board meeting to issue a bulletin and in order to make that available through the mails, we had to enter it as second class matter. It was not the intention that it would in any way take the place of any journal of horticulture—simply an organ of the society through which the members can be communicated with, a place where interesting items can be sent from your local societies, announcements made, etc. Sufficient advertising can be secured to pay the expense of printing, but we must have a certain number of bona fide subscriptions before it can be entered as second class matter at the postoffice. You see if a personal letter should go to each of the members of the society it would cost \$40 postage. Now the matter is up to you. Do you want it at twenty-five cents a year? Why, the matter of co-operation in buying and selling has not been as great a success in some departments because of a lack of means of communication between the members, but it is nevertheless a success, and it has meant a great saving to the fruit growers of Michigan. We do not want to drop it, but if you do, you will see prices go back where they formerly were. But whether you buy through the society or take the plan of co-operative buying, so long as the present system is maintained, the prices will be kept down to the lowest, and you get the benefit of them.

Mr. Morrell—I want to ask about that little publication. What is it—how is it handled—how often published?

Mr. Bassett—The publication is eight pages, issued once a month, and

the price is twenty-five cents. The intent is not to load it down with fruit articles, not to take the place of any other publication, but simply to make it a sort of monthly letter which will be to every member of the society a personal matter.

Mr. Morrell—I think this is a splendid idea, and should yield excellent results. I can see where it can be made an excellent means of asking questions for information which others can answer, and in this way keep informed as to crop conditions, etc. I cannot see any reason why, so far as the State of Michigan is concerned, it cannot be made the most authentic source of information. I will subscribe for five copies to be sent out, and—

Mr. Bassett—I could not send them out that way—they must go to bona fide subscribers.

Mr. Morrell—Then I will send them out to separate people.

Mr. Sabin—I happen to be the secretary of our local society, and have drummed up a few subscribers, but I have found the members so indifferent, and so I have concluded that it would be a good rule to pay for it with the membership.

Mr. Bassett—That cannot be done, for we would get into trouble with Uncle Sam. Nebraska and Wisconsin tried this, but found themselves in trouble. We have to keep close to the line of Uncle Sam. If you want to subscribe for two or three friends, as Mr. Morrell suggests, that would be all right, but your society cannot do it. We cannot, however, include it in the price of the membership.

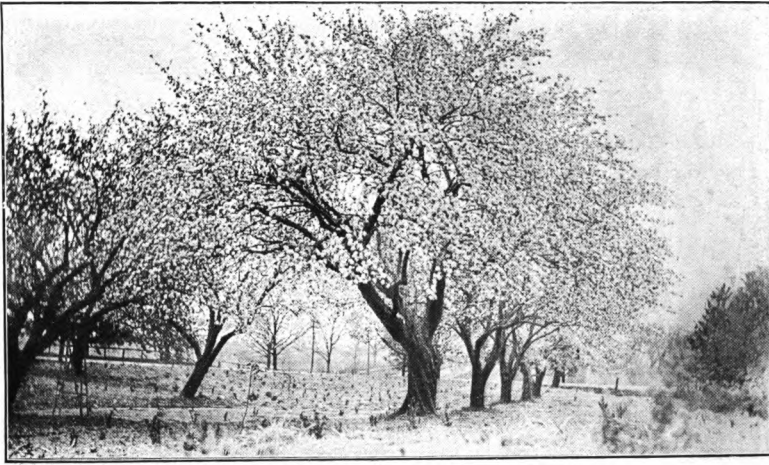
A Member—We will not fool Uncle Sam, but will fool the other fellow. It seems to me that it is up to us to furnish the material for this paper—the editor knows how to make the paper—might we not give Mr. Bassett one or two dollars, paying for the paper several years in advance?

Mr. Bassett—That would be all right.

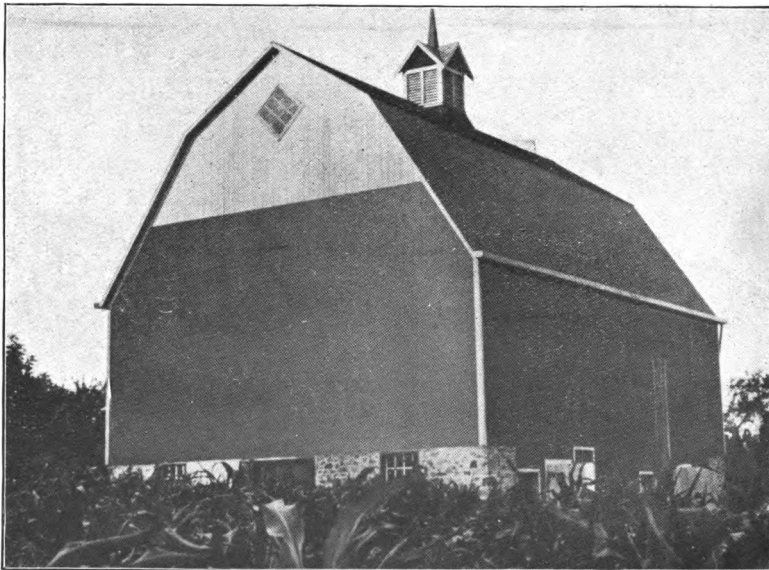
A Member—How much does it cost to send out the whole 2,000 copies?

Mr. Bassett—About \$1.80 per month. I have advertising enough to pay for the paper, but we must have a bona fide circulation.

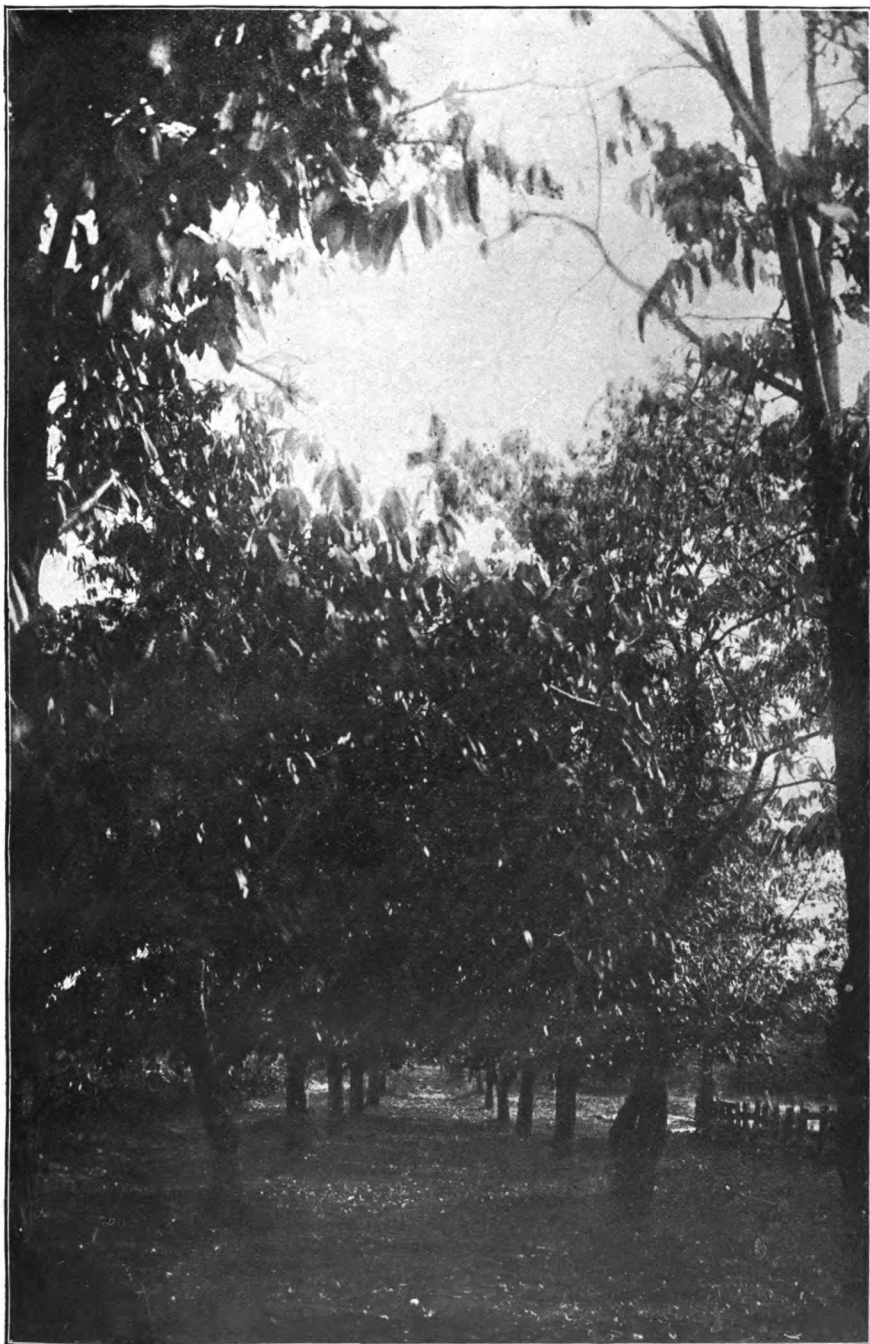
Mr. Hutchins—A few years ago in our section, when we talked of fruit, we always meant peaches. I think now the first thought, or the one uppermost in our minds when we talk of fruit, is apples. And as the apple growers are up against it, we might as well understand from the start the situation. I do not wish to utter scare words, but those of you who have been in close touch with the situation will readily recall that it seems to be a settled policy of the American Apple Shipper's Association to "bear" the market. Last summer when the apple season began to take form the apple buyers started out paying fair figures. Then the Apple Shipper's Association put out a report that was entirely out of proportion to any semblance of fact, and this is in keeping with their general methods. Those of you who noticed this, will recall that immediately after that, the apple market was dead, and remained so until the winter apples were moved. There was nothing in the situation to warrant this, and the government report showed that there was nothing to indicate this bearish situation. But my word for it, in six weeks you will pay as much for apples as you do for oranges. But how are we to combat it? By becoming intelligent, and it is through such a medium as this little bulletin that the facts can be brought out, and so can any of us afford not to give twenty-five cents in order to keep



Some Forty-year-old Apple Trees that Promise Well on Farm of Wm. K. and J. Pomeroy Munson, north of Grand Rapids.



Modern Barn of A. P. Gray, Grand Traverse County. Barn floor double with paper between. Apple storage basement, 44 x 60, capacity 1,000 barrels. Fruit put in loose in barrels; packed at convenience and shipped on orders. Basement well lighted with 10 double glazed 3 x 4 foot windows.



Chestnut grove on A. P. Gray farm near Traverse City. These trees were grown from the nuts, bore at 15 years and are now about 35 years old.

posted? That will be one of the main features of the little paper, as I understand it.

Mr. Bassett—There is one matter of business that should come up perhaps at this time. At the last annual meeting Mr. Charles B. Welch gave notice that at this meeting he would move to change the life membership from \$5 to \$10, and it is now in order that that motion be brought before this body.

The motion being brought before the house, it was spoken to as follows:

Mr. Bassett—At the time that Mr. Welch introduced this matter I was in favor of it, for we were in need of money and while I knew we would lose some, I thought it would work out all right. During the past year we have taken in 77 as life members at \$5 each, but I think the secretary is in a position to speak more intelligently as to these memberships, because that is a part of his work. Now, today I seriously feel that the interest of this society can best be conserved by retaining the \$5 membership. I have gone over some of the figures in regard to annual memberships, and counting the lapses, and averaging the whole thing up, I am confident that we will be better off to leave the life membership as it is than to increase it to \$10. I would therefore ask that the matter of advancing the price of the life membership to \$10 be held in abeyance until next year. We can try it one more year and then if we wish to make a change, it can be done.

A voice—I move that the matter be laid on the table for one year.

Carried.

Mr. Bassett—Notice was also given a year ago that at this time the membership of auxiliary members would be advanced from twenty-five cents to fifty cents. We have certain funds that have in the past been used to pay the delegate's expenses to the meeting. As soon as we had a State appropriation the executive board was in favor of this, and did it, but now that that appropriation is withdrawn, we have to stand on our own bottom and the auxiliary societies could not ask the executive board to spend more money than they put in. We will either have to fix it on some other basis, instead of paying all the expenses, meet a part of them, or cut out this entirely. What is the opinion of the society?

A Member—I move that the matter of raising the fee of the auxiliary society membership be left to the executive board, also the meeting of the expenses of the delegates, to adjust on some fair and equitable basis.

A Member—I am in favor of not raising the individual membership of the auxiliary societies and let the societies pay at least a part of their own expenses, for you will find it is easier to get people to pay money when they see just where it is going and what is being done with it than to send it to the state society.

A Member—I think there is still another reason—it is better for our state society to have 2,000 life members in it than to have 1,000 at \$10, and I believe that we can get the 2,000 quicker at \$5 than 1,000 at \$10.

It was moved that the report of the secretary be accepted.

Carried.

It was here moved to proceed to the election of officers, as follows:

President—T. A. Farrand, Eaton Rapids.

Vice President—O. S. Bristol, Almont.

Secretary—C. E. Bassett.

For Members of the Executive Board—Prof. H. J. Eustace, Chas. F. Hale.

On motion session adjourned for the forenoon.

LEASING ORCHARDS AS A BUSINESS.

S. B. HARTMAN, ATHENS

Only a few years ago the leasing of orchards was uncommon. now nearly every community has one or more persons who make a business of leasing orchards. Why this change? Briefly we shall try to explain.

Owners desire to lease orchards:

(1) Because of a lack of time to care for the orchards themselves. The owner may be a general farmer with plenty of other work to do, or he may be a retired farmer who has leased the farm to a tenant who does not desire to take care of the orchard, or again he may have other business and hold the orchard only as an investment.

(2) The owner may not have the disposition to care for the orchard even if he has the time. He may not like to prune or spray or pick apples, but prefers to do general farm work. His usual excuse for desiring to lease is a lack of time, a very convenient excuse when no other is available.

(3) In some cases the owner really lacks the ability to care for his orchard so as to make it bring good returns and instead of learning how to do this work he prefers to lease the orchard to some one who is qualified to care for it properly.

(4) The San Jose scale has come to be an important factor in the leasing business. The little scale has stepped in to say that the owner must spray his orchard himself, lease it to some one who will, or let it die.

The renter desires to lease because he is often a person who has little capital and cannot purchase an orchard of his own. His only capital is the ability and energy required to make a success of apple growing if he can only get the material to work with. It takes money to buy a good orchard and both time and money to grow one, but the renter can take up the business of leasing orchards with a very small cash outlay. It also enables him to realize on his labor quickly as compared with growing an orchard, and if he is a beginner and desires to plant orchards of his own when able to gives him valuable experience as to varieties, soils and care.

Finally the leasing of orchards is generally an advantage to both parties. This is the only true measure of a legitimate and satisfactory business transaction. Both parties should be benefited. In this business labor and ability are joined with capital and equipment, which makes an excellent partnership. Orchards which were dying with scale have been reclaimed and placed in a thrifty condition, thus greatly enhancing their value without cost to the owner who has also realized more from the orchard than he did before it was leased. At the same time

the renter has established a profitable business with little cash outlay, and has the pleasure of having enhanced the productivity of the leased orchards and made them more valuable to the owner, the community and himself. These are among the reasons why the practice of leasing orchards has assumed such proportions in our State in the last few years.

We should also give due credit to the horticultural department of our agricultural college, and to Mr. Farrand and other pioneer orchard renters, who by their advice and example have done much to induce those qualified to take up this excellent work of saving the orchards of our State and placing Michigan again in the front rank as a producer of choice fruit.

With these introductory remarks on the necessity for and growth of the orchard leasing business I wish to treat the subject proper under the following heads. I. The parties to the transaction. II. The orchard. III. The contract. IV. The financial prospect. Each of these divisions will be considered from the standpoints of both owner and renter. Of the parties to the transaction we will first consider the renter.

(1) First of all he should have ability. He must be familiar with the principles of orchard operations, and able and willing to profit by experience.

(2) He should have a love for the work and a natural adaptability to it. If the work is distasteful to him he will slight it, and orcharding is no business for the careless man.

(3) He should have time to attend to the work. The man who leases orchards must not be tied down to other work too closely if he would make a success in this line, for his operations must be performed on time.

(4) He must have energy. Orchardng is no vocation for the shirk.

(5) He must have good equipment or sufficient capital to procure them. A power sprayer is very desirable but a good hand pump will answer for limited operations. Then he must have good pruning tools, ladders, packages, team and wagon, and sufficient capital to secure labor until a crop is grown and marketed, which may not be the first season.

(6) He must have plenty of faith and staying qualities and not be discouraged at an apparent failure. Success comes in this work as in any other by sticking right by the proposition.

(7) He must be fair and honest in his dealings, both with the owner of the orchard and his customers, otherwise he will sooner or later come to grief.

There are also a few qualities which should be possessed by the owner of the orchard. He should be reasonable and fair minded, otherwise it will be difficult to make a fair bargain with him as he will be too exacting and distrustful. He should also be honest and reliable, willing to carry out to the letter any bargain he has made. An owner who will break as readily as he will make an agreement should care for his own orchard. Furthermore, he should be careful and accommodating. Many conditions will arise not expressly covered by the contract in which case each party should be ready and willing to do the fair thing.

Let us now turn from the parties to the orchard in question. The owner, of course, has no choice of orchards. If the orchard is of good size and in good condition he is probably caring for it himself, lease the orchard, the proposition is then up to the renter.

From the renter's standpoint the orchard should be of fair size. A small orchard, unless conveniently located near another leased orchard will hardly pay for the time lost in getting to and from it. It should also be located near a market or station if possible and near the home of the renter. Time consumed on the road is time lost. I would give a good rental for an orchard near home and near a market, when the same orchard might be worth very little to me if eight or ten miles distant. Again the orchard should have good varieties. Winter apples are generally preferred, but often summer or fall apples pay better if there are enough of them to pay for marketing. It costs too much to gather and market a few barrels of fruit at a time from orchards away from home. A few standard varieties of good quality, such as Spy, Baldwin, Jonathan and Greening are much better than orchards of many varieties such as are generally found in orchards outside of fruit districts.

The accessibility of the orchard for spraying and harvesting should also be considered. The ground should be comparatively smooth, and not too hilly, water convenient and plentiful, fences good, buildings for team and barrels accessible, trees low and not too crowded, nor too far exhausted by scale. Thickness of branches is not so detrimental as they can be thinned out, neither is age a great disadvantage if the trees have low heads, with trunks and frame work capable of holding a good load of fruit. About the worst class of trees we find are those that have had the lower frame work removed by the tree butcher for convenience in working beneath them, or those whose lower branches are dead or lost from scale or crowding. It is difficult and expensive to care for a crop in these high tops, and it takes longer than the ordinary lease to grow a new head beneath them.

This brings us to the most vital part of the leasing business, namely, the contract. All contracts for the lease of orchards should be in writing. It may seem unnecessary at the time to both parties, but neither can anticipate the changes that may take place before the expiration of a verbal contract that may terminate it or render it of little account. I speak from experience on this point for I have in mind two orchards where a written contract was not considered necessary by the owner and we did not demand it. Both of these orchards have turned out unsatisfactorily. In another instance a written contract is all that held an orchard and prevented trouble. If the orchard pays the renter well some owners are bound to be dissatisfied, if it does not pay the renter may be the quitter. The only safe way is to have a written contract sufficiently explicit to cover all conditions that may arise. Some of the provisions which such a contract should include are:

(1) The definition, addresses and signatures of all parties to the contract, including the owner or owners, the renter and the tenant, if there is one. We have found the signature of the tenant especially desirable, as the renter will be likely to have as much dealing with him as with the owner, and his rights and agreements should be carefully defined in the contract. In one instance trouble arose between the tenant and the owner over their verbal agreement as to their respective shares of the fruit. If our contract had defined the rights of the tenant as well as of the other two parties this would have been avoided.

(2) The contract should include the location and description of the

orchard. We usually locate this after the method of land description and give approximate number of trees, also stating if any other than apple trees are included.

(3) The period covered by the contract should be stated. Nearly all our contracts are for six years. We make the term even as it gives both of us an even chance on the "off years." I would prefer to begin with a run down orchard on the "off year" as it gives a chance to put it in better condition for a heavy crop the second year. I should prefer not to lease a badly neglected orchard for less than five or six years.

(4) The agreements or concessions of the renter should be carefully defined. These should include definite agreements as to pruning, burning brush, cultivating, mulching, mowing, thinning, removing undesirable trees, harvesting and marketing fruit, etc. The owner should see that the contract is sufficiently explicit as regards spraying so that the orchard will be kept reasonably free from scale, and if the lease is a share lease other details of care, harvesting, and marketing should be covered.

(5) The agreements or concessions of the owner (and tenant if there be one) should form another clause in the contract. These should include such provisions as access to the orchard at all times, also to the water supply for spraying, buildings for storage of fruit or packages or for stabling horses; agreements as to board and horse feed while working on the orchard, fertilizers, mulch materials, use of owner's or tenant's tools, cultivation, cropping or pasture, fences and confining of stock, rooting of hogs, and any other details for which it may be foreseen that occasion may arise.

Our orchards are all leased with privilege of pasturage of sheep and hogs during the spring and summer. With some the dates of removing them are stated, in others it is optional with us. The pasturage problem has caused us considerable annoyance. Owners, or more often tenants, are careless about turning out stock when they should, or do not keep up fences well and stock breaks into the orchard. If possible to make such a contract we would exclude stock altogether, but one could rent few orchards in our locality in this way. Hogs cause the most trouble by rooting the ground, making it inconvenient in spraying and harvesting the fruit. We now put in a special rooting clause covering this point. If possible the renter should see that water is pumped into an ample storage tank by mill or engine. Life is too short to pump it by hand for extensive spraying. It is well to provide for storage facilities and stable room if possible for these may be needed, also agreements as to board and horse feed if these are to be furnished by the owner. The questions of cultivation, fertilization and mulch material should be settled. In one orchard we get the wheat straw grown on a portion of the farm for this purpose, on another we get barnyard manure.

(6) Finally, the consideration should be stated. If the orchard is leased for a cash rental the amount and time of payment should be stated, if on shares the portion and grade of fruit and division of varieties. Agreements as to division of drops and cider apples should be included, also whether owner or renter is to pick and deliver owner's share. The division of all expenses of care, harvesting or marketing between owner and renter should be clearly stated, and the full authority of marketing should rest with one or the other party, preferably

the renter. Share leasing makes a more complicated contract than cash rental.

Most of our smaller orchards are leased for a rental of from ten to twenty-five bushels of winter apples, tree run, with a proviso that this shall not exceed one-fourth of any crop. These orchards have from twenty-five to one hundred trees each. Privilege of pasturage for hogs and sheep usually until September 1 is granted, also summer and fall apples and cider apples for family use. These owners are getting all the good fruit they can use without effort on their part, and their orchards are improving, both of which were not true before leasing them. Another orchard of one hundred trees in better condition is rented as above with an additional cash rental of \$50 annually. The care of another orchard is charged to the owner. He and the tenant take fruit for their own use and we harvest the balance on halves. Two orchards of 100 and 175 trees, respectively, are leased on shares. We keep an accurate account of all expense put upon the orchards, including pruning, spraying, harvesting and marketing the fruit, packages, etc. This is deducted from the proceeds and the balance divided one-third to the owner and two-thirds to the renter. If the proceeds of any season are not equal to the expenses the renter must stand the deficiency. This plan requires a very complete contract, it being necessary to specify the wages chargeable and many other details and requires a complete and systematic keeping of accounts, but these orchards could not be leased in any other way. The owner of one of these orchards will receive a small balance this season, while the other one will receive as much as the renter would feel like paying for the entire term of the contract on a cash basis.

This brings us to the fourth and perhaps the most interesting division of the subject, namely, the financial prospect. Will orchard leasing pay the owner, the renter, or both?

So far as the owner is concerned we must presume that he would not or could not give the orchard proper care himself, otherwise we would not lease it. His choice, then, is between the entire income from a neglected orchard, or a reasonable cash rental or share of the fruit or proceeds from the orchard when cared for. In every instance in our experience the owner has been a gainer by leasing the orchard as compared with his income from it before leasing. Without effort on his part he is assured of good fruit, a cash income, or both, while under the former regime he received nothing, or at most, some poor fruit.

The income of the renter will vary with the conditions previously mentioned, but with a reasonably favorable opportunity I believe his prospect of a fair profit is better than in any other line of work he can take up with an equal amount of capital.

In conclusion I will give you a few figures on the results from our rented orchards, which may perhaps be taken as typical of what may be expected under similar circumstances. Taking one season with another, our experience leads me to believe that the renter should be able to realize from \$75 to \$100 per acre net on his orchards, which is a pretty fair income for the investment. Last year with a little more than half the acreage we have this season, and about half of the trees in bearing, we sold 160 barrels of summer and fall apples and 443 of winter fruit, besides 50 barrels kept by the owners and ourselves, a total of 653 barrels.

The total receipts from the apples sold was \$2,076.16. The cost of growing, picking, packing and packages was \$846.36, leaving a net profit of \$1,229.80. Our accounts show that the picking and hauling of the winter apples cost approximately 35 cents per barrel, the packing 20 cents, barrels 30 cents, spraying 42 cents. These figures include the care of the trees not bearing. The average number of trees to the orchard was 65, and the average distance from home and shipping point four miles.

This year with perhaps two-thirds of the trees bearing a good crop we have harvested about 2,000 barrels. The fruit is not all sold so I have no detailed figures on the returns, but I have computed the cost of the crop from the largest of these orchards and estimated the value of the crop from the part already sold.

This orchard comprises about 175 trees perhaps fifty years old, and up to last year had received practically no care. The greatest amount the owner had ever obtained from the fruit was \$100. The trees reminded one of brush heaps and were quite badly infested with the scale. Last year we leased this orchard for two-thirds of the net proceeds, pruned about two-thirds of it and sprayed it as thoroughly as we could. The orchard blossomed very lightly, producing less than fifty barrels of fruit, and leaving us about \$100 on the wrong side of the ledger.

This year we pruned the balance of the orchard. It blossomed full and we sprayed it thoroughly, thinned the trees most heavily loaded, and mulched about half of them with straw. The figures on this orchard for the season are as follows:

	<i>Total.</i>	<i>Per tree.</i>	<i>Per bbl. fruit.</i>
Pruning and burning brush.....	\$55 10
Spraying, 3 times, 6 applications, 112 barrels spray	108 35	\$0 62	\$0 10
Thinning	29 55
Mulching	11 75
Picking	179 75	1 03	16
Hauling to packing house	90 80	52	08
Packing	171 65	98	15
Marketing (to car).....	55 50	31	05
Barrels	385 00	2 20	35
Total expense of crop.....	1,090 45	5 96	95
Value of crop (partly estimated):			
827 No. 1 at \$2.75....	\$2,276 25		
92 No. 2 at \$1.50....	138 00		
271 drops at \$1.50....	406 50		
23 ciders at 50 cents.	11 50		
	2,832 25	16 18	2 57
Net profit	1,741 80	9 95	1 62
Net profit owner's share.....	580 60	3 32	54
Net profit renter's share.....	1,161 20	6 64	1 08

DISCUSSION.

Question—On those trees, what has been your experience in heading them back, cutting out old limbs—does it injure the tree?

Mr. Hartman—No, I do not think it injures the tree. One objection

to it we found that it caused a good many water sprouts and we have to follow that up by pruning later. But this is the method we follow—just as fast as we can we cut the tops of these high trees down to where we can handle them.

A Member—What price do you figure labor, team and men at?

Mr. Hartman—This orchard which I gave you the price on, it is stated in the contract that I am allowed \$3 a day, power sprayer \$1.50, teams \$1.50 and the other labor at actual cost, \$1.75 per day this season.

A Member—Tell us about your mulching—how deep and what of?

Mr. Hartman—On this orchard we put twelve loads of straw, and some three or four inches after it is settled down. Then we put about half a load of manure to each tree.

Question—Do you put it on the sod?

Mr. Hartman—Yes, on the sod in the summer time. The grass will crop through the mulch, but still not very much.

Question—What would be the highest and the lowest price you want to pay?

Mr. Hartman—So much depends upon the orchard, the condition of the trees, distance, convenience, size of trees, etc., many things that I might name, that it would be impossible to set a cash price. Our president would be more competent to discuss that. I should say, however, from 50 cents to \$1 per tree would be about the average.

Question—Do you mean annually or for a term of years?

Mr. Hartman—Annually.

Question—It would make a difference, too, whether they were Ben Davis or Northern Spies?

Mr. Hartman—Certainly.

Question—I should like to ask Mr. Hartman if he applies that mulch over the orchard or just under the trees?

Mr. Hartman—We begin about half way out from the trunk, and then went out beyond the limbs. If we had plenty of mulch we could do so on the whole orchard. We want to put it where it will do the most good.

Question—Do you cultivate the orchard or leave that to the hogs?

Mr. Hartman—If you rent a small orchard far from home the expense of cultivation is too great in this case—do not pasture unless you have to.

Question—I would like to ask how much per acre it would cost to cultivate that orchard, if you had to hire the labor?

Mr. Hartman—I do not know how much it would cost, but I know that we would have to double the rental if they were not pastured. Then add to this the cost of taking tools four or five miles, coming back—all this takes time, and time is money.

Question—How far away from home do you think it practicable to go?

Mr. Hartman—We have only worked close at home—our furthest orchard is five miles away. Mr. Farrand goes several hundred miles away from home.

Question—Does that mulch hold moisture?

Mr. Hartman—It will assist in holding moisture. I believe that mulching at a uniform depth will hold as much moisture as cultivation.

Question—Have you kept an account so you can tell whether it is more profitable to feed the fertilizer to the tree more than to the field?

Mr. Hartman—I know just what each orchard is paying me.



Bartlett Pears will always be standard. At the back can be seen some of the California "lug boxes."



The Red Canada is one of Michigan's best quality apples and should be more generally grown.

Question—What I wanted to know is, whether the Baldwin would pay better than the Spy?

Mr. Hartman—So far as the demand is concerned, we have more demand for Northern Spy than anything else. I do not like to pack Northern Spies because they are uneven. I think on the whole that the Northern Spy tree will pay as well as any other variety we can grow in Michigan.

Question—Will the Spies keep as well as other varieties?

Mr. Hartman—No, but they are a pretty good keeper. We have kept them in cellar storage and shipped them to customers and we have had no particular complaint with the keeping.

Question—Are they keeping as well as they did ten years ago?

Mr. Hartman—I could not say.

Question—Why I asked that question is that I do not think they keep as well now as they used to.

Mr. Hartman—I have found that Northern Spies do not keep quite so well this year as other years.

Question—Do you expect to continue this mulching process for a period of years without plowing?

Mr. Hartman—Yes, we expect to do that with the rented orchard. I am not talking about the orchards we have at home of our own, part of these being cultivated and part mulched, and we do not let stock into these.

Question—At times when you cannot handle the orchard as you would like from any cause, is there any complaint from the owners?

Mr. Hartman—No, we have had practically no complaint on this score. The owners with one or two exceptions that I referred to are fully satisfied, and we have a number of orchards in the neighborhood that we can lease at any time.

Question—Why do you not lease them?

Mr. Hartman—Some are not worth leasing—some need too much thinning, or are too far away, or for some other reason are not desirable.

Question—Are we given to understand that these orchards that have been mulched have the hogs turned into them?

Mr. Hartman—Yes, the orchard I referred to the stock was turned in but it was turned out before the mulching.

Mr. Gray—Did you say you did not want to get up any argument about sod mulch? (Yes, I made that statement.) Are not some orchards being cultivated this way?

Mr. Farrand—I would like a minute to say a word on this subject. At the Grand Rapids show I saw ten or twelve bushels that came right off sod that was just fine. Whether the particular season had anything to do with it or not, I could not say—if we had had a dry season I do not know what would have been the result. I have for many years talked against sod mulch, but I begin to think a good coat of manure each year would carry us through without cultivation. I should like to know the experience of others.

A Member—On my farm I have an orchard that had been for ten or twelve years right on sod, before I bought it, and when I got possession of it, I did not want to break it up, I thought it would be worth more as a hog pasture. There were some Northern Spies that were not bearing as they should. I hauled out manure and put around the trees and

they did much better, but I think for me I got better results by breaking the orchard once in two or three years. In regard to the expense of cultivating the orchards, if we break the orchards in the spring and not cultivate too late, so we can sow a cover crop like peas, if there is not too much sod, or if we can put it in in corn and not cut the corn, and then turn in the hogs on the corn instead of cutting it, you pasture the hogs cheaply and get a humus on the ground.

Mr. Hall—I am from Ionia county. We have one orchard up there that I do not know as it was ever plowed since it began to bear, and that is the N. B. Hayes orchard. The approximate yield of that orchard as he gave it to me was about 2,800 bushels of No. 1's and No. 2's, or a little over \$8,000 for the crop. His system is sod mulch with plenty of stable manure and sheep. I would not dare to turn sheep into an orchard of mine, but he does. He has more nerve than I do. This is considered one of the best orchards in southern Michigan.

A Member—If there is anything that I want to discourage it is sod mulch. I know of an orchard whose owner had a sod mulch and it was not worth half as much as when it was cultivated.

A Member—I would like to ask what kind of sod mulch that is?

Answer—I cannot answer that question for I am not endorsing that system.

Mr. Rowe—I may say that I am watching two orchards and have been for a number of years—the Watkins' orchard in Jackson county and the Farnsworth orchard at Toledo. Watkins' orchard was never plowed, and the Farnsworth orchard has not been plowed, and when I was there Mr. Farnsworth was gathering apples and the growth under the trees was so thick that an apple could not get to the ground. I asked him what he thought of plowing that up, and his reply was, "No, no." Now both these orchards are producing large crops of excellent fruit.

A Member—I have been raising apples for the last twenty-five years on sod mulch. And so favorable am I to it that I would not allow a man to plow it up if he would do it for nothing and board himself, for I can produce just as good fruit without cultivation on my land as with it.

A voice—I would like to hear from Mr. Hall.

Mr. Hall—We haven't any patent on our system. As long as I have come to this meeting to learn something, I don't propose to be a sponge and absorb altogether and not give anything if demanded. However, I do not feel particularly proud of our attainments, but after all, they have been fairly satisfactory. Twenty years ago, as has been stated, I planted out the best twenty acres of land on my farm to an orchard, and some of my neighbors said that they felt sorry for me. I could raise from twenty-five to thirty-five and sometimes forty bushels of wheat to the acre. "It was too good a field to spoil," they said, and I confess that at one time I felt that way for a little while, too. Fourteen years did seem like a long time to wait before any revenue came in from the orchard. But all during this time I continued to raise wheat. I have been accused of being a robber and I plead guilty to the charge. But this summer I was fortunate in having one of the men who so charged me visit our place this summer and he went out through the orchard—he was a rather short man, and I had Canada field peas up to

his waist. Just before we got out we had a little shower, and here was a time, I thought, to show this man that robbing an orchard was a good thing, and so I took him just as far through this piece of wet peas as I could get him to go. He had nothing further to say on the matter of soil robbing.

And to the young men who are contemplating planting an orchard, I want to say, you need not be afraid to plant good land to an orchard. I am speaking of the conditions we have passed through—I say no young man need be afraid to plant out an orchard on his best land. I gave a chattel mortgage on mine, but before the orchard came into bearing I had it all paid off.

As to the treatment of this orchard would say that we plow it once a year, as early in the spring as the land is in condition to work. We sow it to Canada field peas. In later years we have used the disc head on the plow, going twice over with the disc and sowing on peas. When the peas get ripe, we turn in the hogs, all we have. Now, if anyone has had any difficulty with hogs injuring the orchard it is because of the orchard or too many hogs. Five hogs to the acre. Last year we put in \$1,000 worth of corn and we sold off \$1,900 worth of pork. This should be credited to the orchard.

This orchard came into bearing at fourteen years. It has now borne six annual crops, but they are getting larger every year. The trees are still young and have not got to their prime. They have several years before them to get up to where they are complete in their bearing. Last year our No. 1's sold on the Chicago market at \$10.50 per barrel. When you get the right kind of fruit and pack it as it should be, you need not fear western competition. I thank you.

REPORT OF COMMITTEE ON SPEAKING CONTEST.

BY THE CHAIRMAN, MR. ROWE.

Mr. President—The committee desires to say before announcing the awards for the addresses given by the senior class of the M. A. C., we think it is only justice to them to say that we consider them the best that has ever been heard before the State Horticultural Society from this class of students, and we question whether twelve men could be picked from the State Horticultural Society to present these topics any clearer or more concise in the same length of time.

The first prize we award to Mr. Schleussner, the gentleman who spoke on the San Jose scale, and the second prize to Mr. McDermid on "Brown Rot," and the third prize to Mr. L. B. Gardner, on the Codling Moth.

Awards.

Cup—C. J. Monroe, South Haven.

Gould Special—Wm. Harter, Custer.

1. C. E. Campbell, Kalamazoo.
2. S. B. Hartman, Athens.

3. Allen Winnie, Bangor.
4. George Chatfield, South Haven.
5. Henry Smith, Grand Rapids.
6. C. B. Cook, Owosso.
7. C. E. Lawrence, Cressey.
8. C. J. Monroe, South Haven.
9. Dr. W. P. Morgan, Saginaw.
10. C. A. Pratt, Custer.
11. D. W. Leedy, Scottville.
12. John Leedy, Scottville.
13. J. T. Lair, Scottville.
14. G. V. Green, Scottville.
15. Rev. Flemming, Scottville.
16. Mr. Griffin, Scottville.
17. Mr. R. Filly, Scottville.
18. J. H. Willson, Scottville.
19. W. H. Ressegive, Custer.
20. John Smalley, Scottville.
21. Mrs. Mohler, Scottville.
22. W. H. Cable, Scottville.
23. Wm. Calkins, Scottville.
24. George Tetter, Scottville.
25. Wm. Slagle, Custer.
26. F. B. Miller, Custer.
27. C. P. Reese, Custer.

REPORT OF COMMITTEE ON EXHIBITS.

Your committee on exhibits beg leave to submit the following report:

We find on display a number of fine plates of apples which are indeed a credit to the State and to their respective localities and exhibitors.

Among these plates of apples were the following:

Mr. Geo. E. Chatfield, South Haven, five plates.

Mr. R. E. Lawrence, Cressey, four plates.

L. E. Hall, Ionia, two plates.

Winnie & Sons, Bangor, fifteen plates.

C. E. Campbell, Kalamazoo, twenty-one plates.

S. B. Hartman, Athens, twelve plates.

C. J. Monroe, South Haven, three plates.

W. B. Morgan, Saginaw, one plate.

Henry Smith, Grand Rapids, three plates.

Fifteen plates, grower's name not attached.

There were the following entries of boxed apples in the contest for the Pratt Scaleide Silver Cup:

Winnie & Sons, Bangor, one box each of Steele's Red, York Imperial and Ben Davis.

S. B. Hartman, Athens, Baldwins, Greenings and Spies.

C. B. Cook, Owosso, Baldwins, Jonathans and Wagners.

George Chatfield, South Haven, Spies, Spitzenburg and Jonathan.

C. J. Monroe, South Haven, Baldwins, Wagners and Grimes Golden.

A. M. Bullock, Lapeer, two boxes Baldwins and Spies.

There was a fine collection of roses, chrysanthemums and carnations from Henry Smith of Grand Rapids.

There were also two dozen white chrysanthemums from the M. A. C. greenhouses. The society is greatly indebted to Mr. Smith and the M. A. C. for these decorative features.

The magnificent exhibit of Mason county fruit was one of which the county and indeed the entire State may be justly proud. The fruit was collected and arranged by the Mason County Horticultural Society and the Custer Horticultural Society. There were upwards of 150 bushels on display. The Mason County Society display was mostly in bushel boxes, the Custer Horticultural Society displaying theirs in boxes, plates and pyramids.

One of the noticeable features of the exhibit was the predominance of the King apple. One bushel box of this variety, in particular, was filled with thirty-nine apples. The splendid quality, high color and freedom from blemish of these apples shows well that Mason county growers know how to raise good fruit and the county is entitled to front rank among the apple counties of the State and country.

In the commercial exhibits we find the following:

Mr. John S. Tilly, of Watervliet, New York, shows a fine line of extension and step ladders and his exhibit draws considerable attention from the orchardists.

The Hemingway Chemical Co. of New York, show samples of arsenate of lead and other chemicals of value to fruit growers.

The Vreeland Chemical Co. of New York, shows a line of agricultural chemicals, the leader of which is Electro arsenate of lead powder.

Dow Chemical Co. of Midland, Mich., shows a line of lime-sulphur and arsenate of lead.

Specimens of nursery stock is shown by Collins Nursery Co. of Fennville and by Harrison Nursery Co. of Berlin, Maryland.

Of spraying machinery there is a large display, most of it in operation and with attendants in charge to explain the good points.

The Wright Manufacturing Co. of Pontiac, show one pump, and would have had a power outfit but for the dilatory methods of the railroad company.

The Gould Pump Co. have a display of hand pumps.

Brown-Bair Co., Belding, show one power outfit, using the Myers pump.

New Way Co. of Lansing, one power outfit and engine.

Hardy Sprayer Co. of Hudson, show two power outfits.

Colby-Spitler Co. of Hart, show four power outfits operating the Meyer pump.

Gile Co. of Ludington, show one power outfit.

Peerless Power Co. of Minneapolis, Minn., show one western power outfit.

Field Force Pump Co. of Elmira, New York, show two gasoline power outfits and one horse power potato sprayer.

National Engine Co. shows two farm gasoline engines.

PACKING AND SELLING MICHIGAN APPLES IN BOXES.

A. M. BULLOCK, LAPEER.

The manner of packing Michigan apples seems to be at about as uncertain a stage as the spraying was two years ago.

To the successful apple grower the question of how to pack and dispose of his crop is certainly a vital one. For some reason commission men and buyers generally are opposed to the using of boxes for the packing of Michigan apples. The cold storage charge nearly as much for the storing of a bushel box as they do for the barrel. Thus putting one who uses the box at a disadvantage.

From the limited experience of the writer it would seem as though apples as ordinarily put up in barrels are in such condition they appeal to no one.

Those who wish fancy fruit do not care to pay a good price for a lot of culls, and those who wish the cheaper grades can not afford to pay for fancy ones.

The one who raises good fruit does not care to have the same allowance made in price for poor apples in the center of the barrel as is made for apples which have only enough good ones for facers. Probably because he hasn't enough poor ones to keep up with the other fellow. These conditions are not helped at all by boxing where poor fruit is put in boxes. During the past season the writer has seen apples in boxes which should not have been put into a barrel of twos.

One of the first essentials in boxing is to secure good substantial boxes of standard dimensions holding a bushel. In using the light boxes they are liable to warp, thus causing the pack to be uneven, and they are also liable to split and break open and the fruit is more liable to be bruised and injured.

Good paper should also be provided, the large sheets being cut just a trifle shorter than the box and long enough so that two sheets will reach around the box, leaving no space between for the apples to come in contact with the outside air. The small sheets should be just a trifle smaller than the inside dimensions of the box. It should be tough and impervious to the air. Apples covered or wrapped with paper retain their flavor and freshness better than when exposed to the atmosphere.

A packing table should be provided sufficiently large to allow two persons to sort and two to pack. One that has given satisfaction is about three by six feet, covered with burlap in such a way as to leave no sharp points to cut and bruise the fruit. Pieces should also be put across one end extending far enough beyond the table to hold two boxes on each end. The boxes should be held at a slight angle to prevent the apples rolling as they are placed in the boxes.

The packing of the three, four and five tier boxes is very simple, merely putting the required number of apples in rows across the box. To pack the three and one-half tier an apple should be placed in one of the lower corners and another about two-thirds of the way across the end of the box. Then one should be placed against the side opposite from the first

one and another to fill the space between the first and second. The rows can then be finished angling across the box. For the four and one-half tier place an apple in each lower corner and one in the center of the box. Then place in the next row in the spaces left by those in the first one. The rows can then be finished by angling across the box. A sheet of paper should be placed between each layer of apples and the box filled with the same size fruit.

Slightly thinner apples should be used at the ends of the box than in the middle. The ends should be just flush with the top and the middle raised about one to one and one-half inches. If not the right height one or two layers can be laid upon the side. A press should be provided to hold the covers in place while nailing.

As has been said there seems to exist a prejudice against eastern box apples. Unless one wishes to follow up his trade year after year it would be useless to try selling box apples. Without any doubt a large part of this prejudice is due to non-uniformity, size and shape of packages, differences in sorting and different methods of packing and marking. Each box should be marked with the name of the grower, name of variety, initials of packers and number of tier. This can be done either with stencil and rubber stamps or by pasting lithograph label upon box.

It never pays a fruit grower to give short measures. Unless the fruit growers of Michigan can succeed in establishing uniformity in putting up their fruit they will be handicapped in putting their fruit upon the general market in boxes.

Of course, one can establish retail trade of his own by selecting some town within easy shipping distance and supply his customers with their fruit each year. We have tried this plan for three years and have been fairly well pleased with the results. The average cost of supplying customers in this way is about the same as when handled by commission men. If one expects to hold any first class trade, whether packed in boxes or barrels, the packages must be so marked that they can be easily recognized and the growers guarantee such that any defect in packing or quality will be adjusted without loss to the buyer.

DISCUSSION.

President Farrand—There are those who are for and others against the box packing of apples in Michigan. We want to get all the information we can on the subject, and now is the time. Let us have it out.

A Member—What size boxes do you use?

Mr. Bullock—I do not remember the exact dimensions—about $11\frac{1}{8}$ by $11\frac{3}{8}$ by $18\frac{3}{4}$ —the standard size box made.

Question—About 2,400 cubic inches?

Mr. Bullock—I think it is 2,250 inches.

A Member—I should like to know how much you allow for heap measure?

Mr. Bullock—The box holds a full bushel by weight—I do not know about the heap measure—I do not think anything is allowed for that.

Mr. Rowe—I do not care to enter into the discussion of the methods of packing at this time, for our time is limited, but I would like to make this request, that I may have the privilege of selecting an expert box packer from the west to present a paper at the annual meeting of the

State Horticultural Society and then show how it is done and done right. I tell you we do not understand the first principles of handling box packing. It has never been shown in the State and I would like to have it presented by an expert from the west who is getting out car loads and car loads every year, because I believe that when we understand the matter, and understand it right, it will be only a matter of a year or two when most everybody will fall in line and use boxes.

President Farrand—This would be a matter that would be up to the Executive Board. Personally I would be in favor of it.

Mr. Rowe (continuing)—You may talk until doom's day, but what we want to do is to get right at the thing. I would like to get Mr. C. J. Zenzel, chief judge at Spokane last year, and one of the largest packers in the west, to come here and show you just how it is done.

Question—Would he pack the apples here?

Mr. Rowe—He would bring the apples or take apples here and pack them.

A Member—I would like to have question No. 8 answered: "Is the flavor of an apple preserved better by being wrapped in paper for winter and spring use?"

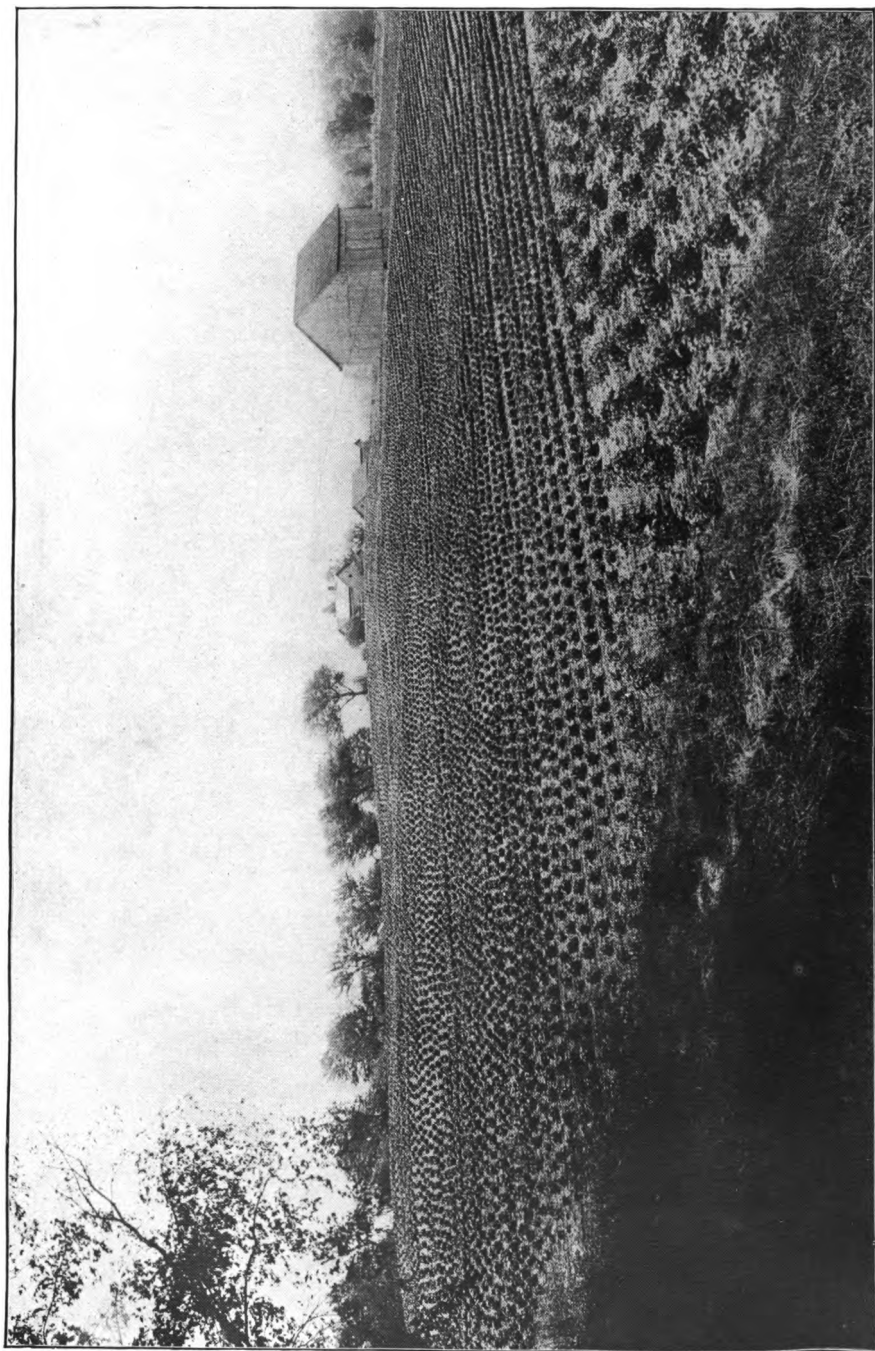
Mr. Bullock—It has been our experience that it has and I think you will find that any apple wrapped in paper will retain the flavor better than when left exposed to the air. When selling to city customers they will appreciate the keeping of the flavor of the apple.

A Member—Another question, No. 23: "What progress are Michigan growers making in the use of the box for fancy apples in place of the barrel?"

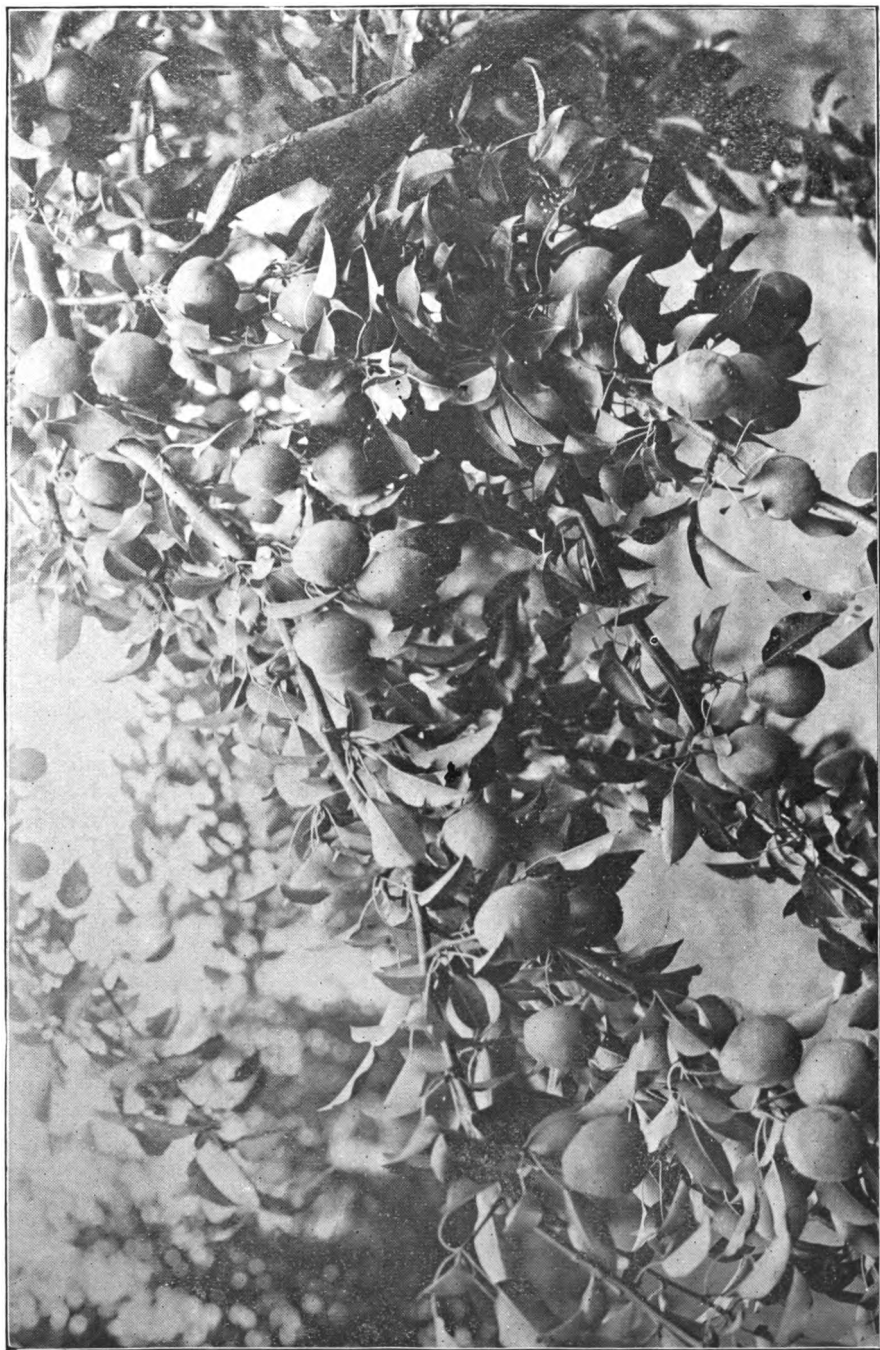
Answer—Out in the west the growers are grouped together in valleys, while here in Michigan we often find growers so widely scattered. In my own case, there is not a man within five miles of me that grows apples at all. I grow a few and I do not know of anyone that I could go in with to do the box packing act. We are so widely scattered that we could not get together so that we could use an expert box packer, and for that reason I do not see how we could use the box, unless we learned to pack it, and the barrel is so much more in common use that I think it will be a long time before the box comes into general use.

Mr. Rowe—The western apple growers are, of course, grouped closer than in Michigan, but that has nothing to do with the style or shape of the package in which the fruit is placed and I doubt if there is a man in this room, certainly not an apple grower in Michigan, but what, when shown the foundation principles of box packing in a practical way but what will catch on and learn to do the work himself. There is not a boy in our high schools who, cannot, after being shown the foundation principles of apple packing, become an expert packer. It is simply routine, as simple as A, B, C, as soon as it is learned. To pack apples as they should be is not very difficult, and then the boxes are more easily handled on the wagon, easier to handle in the store, in transportation. The barrels are rolled and the apples get more or less bruised, and it is found that apples can be handled ten per cent cheaper in boxes than in barrels.

Mr. Hartman—It seems to me that the only objection to the use by the Michigan growers of the box right away is the fact that it is hard to get more for our apples in boxes than in barrels. We are not expert pack-



Field of Beans, taken early in August, 1911, on farm of Ransom Jones, near East Jordan, Charlevoix County.



Clairgeau Pears on fruit farm of W. M. Irratt & Son, Benton Harbor.

ers, but we can get them in the boxes after a fashion. In almost every case we have got the most for apples packed in barrels for the same grade of fruit, although we have succeeded in getting a better price in boxes than any quotations of western fruit for that day. This year, for instance, on fancy fruit some sold for \$5 per barrel, while the same grade sold for \$1.50 packed in boxes. It seems to me, however, that we should get this market worked up, but if we sell private orders, it costs more to ship in boxes than in barrels.

A Member—I think if the same grade of apples were packed in barrels that are packed in boxes, with the stencil of the owner on the barrel, they will bring practically the same price, excepting in private families, and there they may bring enough more to pay the extra cost of packing. It costs more to pack in boxes than in barrels.

A Member—How much more?

Answer—Not so very much—perhaps from fifteen to twenty cents per bushel.

Question—What do the boxes cost here?

Answer—They cost about fourteen cents ready to put the apples in.

Question—Nailed up or knocked down?

Answer—They cost twelve cents at the factory, and I pay a little over a cent a box for nailing up and the paper.

Question—Do you not find most boxes too light?

Answer—Yes, I do.

Question—What is your side stuff?

Answer—It is five-sixteenths of an inch.

Mr. Rowe—The average cost of material in California for the apple box is ten and one-half cents in the knock-down. It costs them forty-five cents per one hundred to have them nailed up ready to put the apples in. It costs them from four and one-half to six cents to wrap and pack in the boxes. Total expense of wrapping and packing the apples, including the paper is less than five cents per box, so that the box and the wrapping is right around fifteen cents. That is where they are putting out the largest quantity of any apples I know of. In Colorado the cost is a little more for the reason that they have no employment for their laborers except during the packing time and so have to get green hands, and that makes it more expensive, but even then the boxes and the packing and wrapping does not exceed twenty cents, which would make sixty cents for packing in barrel.

Question—Why use boxes, what real advantage have they over barrels?

Answer—Well, they look better as a package. The boxes pile up better. You can get more fruit in a given space.

Mr. Rose—Anybody can pack those western apples when they are graded up. Let the expert come here and pack our Spies.

A Member—If that expert is brought here I would like to furnish the Spies for him to pack.

A Member—I have understood that they actually in the Chicago market take the western apples from the boxes and put them in barrels. A commission man in Chicago told me that when they bought apples from orchards they preferred that they be put up in barrels. When Tommy Smith bought apples out in Colorado he had them put up in barrels. That was to cater to his trade.

Mr. Rowe—I would just like to say this word further, not to prolong

the discussion, but there are twenty-six men that I know of that have employment during the whole winter season on South Water Street in Chicago under the direction of the cold storage people, taking Michigan and New York apples out of barrels and repacking in boxes, to sell for fancy fruit. These people do not want to encourage the apple men to do in their orchards, for they wish to make the extra profit out of them themselves. They keep these men employed all winter doing that work. I know what I am talking about on this matter, and what I say is the exact facts in the case. The gentleman I spoke of would just as soon pack Michigan apples as any other. Their apples out west are just as hard to pack as the Northern Spy. What I am pleading for is that you have a chance to learn more than you know now.

Mr. Morrell—We have had this talk about packages for apples for the last twenty-five years. We are always talking about something that we cannot agree upon. You have overlooked the most staple package for the bulk of Michigan apples, and I would like to know what you think about it—I refer to the box car?

A Member—We have already used that too long.

Mr. Morrell—It fits one grade, and a large one, too, of our apples.

A Member—But we want to get away from that grade of apples. I said some of my apples were packed in boxes, some in barrels. We find after an experience of three years in using boxes that there is considerable difficulty experienced in getting packers that it would do very much good to give any extended instruction on account of their being there only so short a time, only two or three weeks. That is one of the difficult propositions we have in Michigan. My idea in the beginning of this was to get a trade in box apples, a retail trade, for I found that box apples would sell to private families better than barrel, especially south, where the cellars are too warm, but where they can be placed away in the attic more nicely, and so they prefer the box to the barrel.

SPEAKING CONTEST OF M. A. C. SENIOR STUDENTS IN HORTICULTURE.

The plan of offering cash prizes for contests in fruit judging and speaking, to be open to the horticultural students of the Michigan Agricultural College, was originated by the Michigan State Horticultural Society and has come to be the most interesting event of the annual meeting. Several other State societies have copied the plan, with more or less success, but this year's session proves that the Michigan students are in a class by themselves.

Twelve fine appearing young men took part and in the five minutes allowed each speaker there was more sound thought, well expressed, than in any other part of the annual program. Each young man won credit for himself, his instructors, the department of horticulture and the Michigan Agricultural College.

It was a difficult job for the judges to decide just which speakers were entitled to the cash prizes of \$15, \$10 and \$5 for speaking—similar

amounts being awarded in the contest of identifying and judging the varieties of apples.

Following are the addresses of the senior students:

HOW LIME AND SULPHUR KILLS THE SAN JOSE SCALE.

O. SCHLEUSSNER.

(Awarded first prize.)

We have all along known that Lime and Sulphur spray is the sovereign remedy for the San Jose scale, but I doubt if few of us have ever had any idea of how it did the business or why. All we cared to know was that if we applied it to a tree infested with the scale that it did the work, and that after we left that tree all the scale on it were dead. We knew the scale disappeared, but not why it disappeared.

If any of us had any idea as to the action it was probably an erroneous one, for it is only in the past year that Dr. George D. Shafer of the experiment station has worked out the true action upon the scale. I know that personally I always thought that there was some sort of a caustic action, and that the scale were sort of eaten up, as by an acid; for I knew that if I got the spray on my hands it would make them sore, and I thought that it would act the same way on a scale. Another general view has been that the spray has killed the insect by choking it to death. Almost all insects breathe by small pores or openings in their sides, called tracheae, and it was thought by many that the mixture got into these and plugged them up, and thus caused choking, just as we would be choked to death if some one were to plug up our nose and mouth with sealing-wax. As a matter of fact, the Lime and Sulphur spray does destroy the insect by suffocation but in a different way than the one which I have described.

In order to understand how it works, we must first have some idea of the nature of the spray itself. We all know that when we boil the lime and sulphur together to make the spray, that when we have finished we have something different than what we started out with—that is that we have a chemical combination of lime and sulphur—not a mixture of them but something quite different than either of them. In the same way we might say that we eat beef and potatoes, we keep them in our bodies, but they are changed and now are no longer beef and potatoes but human flesh, blood and bones.

What we have in the case of the boiled lime and sulphur, is a compound known as Polysulphides of Calcium. This compound has the property of taking oxygen from the air to make it form calcium thio-sulphate, after which it takes up more oxygen, forming sulphites of calcium, and as a final step forms sulphates of calcium again taking up oxygen to do this—in every step taking up always more oxygen from the air you will notice.

A knowledge of this property led to some experiments to determine exactly how much oxygen was taken up, and by placing a filter or

blotting paper saturated with the compound in a large bell jar, and testing the contents chemically, it was discovered that a very little Lime and Sulphur would use up all the oxygen in the air in quite a large bell jar.

We know that all animals must have oxygen to breathe, and the question at once arose as to how little oxygen a scale could do with. So a number of scales were put in a jar in which all the oxygen had been extracted from the air, and only the nitrogen remained. In about six hours almost all were dead.

This led to a field study of scale insects after spraying, and a close application of the knowledge gained led to the following discoveries. It was found that when the spray was applied, some of it always worked under the scaly covering of the insect and formed a little ring under there. The caustic action of the compound made it soften the wax on the edge until it was in a sort of half melted state, so that when it rested against the bark of the tree it pressed down on it, and soon sealed itself down, making a little air-tight shell fastened hard to the bark. We might get the same result by making a little shell of sealing wax, heating the edges, and then pressing it up against some tree. Well, in this little air-tight box the Lime and Sulphur started working, and soon it had used up the oxygen in the air there, and the scale being sealed down from any of the outside air soon suffocated, just as it did in the bell jar.

In order to make sure that there could be no mistake, and that the scale could by no possibility get oxygen from the tree, a glass tube was put around the trunk of a tree, the ends sealed tightly, and it was left there for some time, and then tested. It was found that instead of giving off oxygen, the tree actually used it up, and therefore could be of absolutely no assistance to the scale by giving it oxygen. This was accepted as final proof that the scale was, so to say, choked to death in the manner explained.

In summing up, we may say the great usefulness of lime and sulphur spray lies in its ability to take much oxygen from the air, and in its caustic properties that enable it to seal the scale down tight to the tree by softening the wax at the edge.

THE BROWN ROT OF THE PEACH.

F. H. McDERMID.

(Awarded second prize.)

The brown rot of the peach is one of the worst diseases, with the exception of the yellows, that affects the stone fruits. It not only is severe in the case of peaches, but it also causes great losses on plums and cherries.

The loss in this country is estimated by investigators to exceed five million dollars annually. It is a fungous disease especially favored by warm muggy weather. It attacks the blossoms in the spring causing them to wither and fall. The mycelium, or body part of the fungus

penetrates the twigs killing them back from the tips. Later attacks show on the young fruit as a small brown rotten spot which grows rapidly in favorable weather. Soon pustules of grayish matter appear in concentric circles in the rotten spot and often are so numerous as to give a moldy appearance to the fruit. These are bunches of summer spores which correspond to the seeds of higher plants. These spores are rapidly spread by wind, rain, or insects. The curculio is very active in some localities in spreading these spores, and in some cases as high as 90 per cent of the fruits affected have been traced back to curculio injury. Another source of loss is in the handling of the fruits. The pickers handle some of the diseased fruit while harvesting the crop, and thus some of the spores get on the sound fruit. At the packing house these are further spread so that during long shipments in hot moist weather as high as 50 per cent of fruit, sound at packing time, is spotted with rot on arriving at market.

To control this disease, we must know how it lives from one year to another. The mycelium in the twigs may live through the winter and grow the following season; spores may winter on the mummied fruits on the trees; and in the fruits that fall to the ground, the mycelium lies dormant for two winters and in the second spring sends out toadstool-like growths which bear ascospores (winter spores) which appear about blossoming time. These will also cause the same form of disease as the summer spores. These mummied fruits lie partially buried in leaves or soil and their development is due to moisture.

In pruning remove and burn all old mummies and dead twigs from trees. Plow under the mummies on the ground. This will reduce the sources of infection and the rest must be controlled by spraying. Spraying must include treatment for the spores and the curculio. For the spores, self-boiled lime-sulphur is used because peach leaves are very sensitive to Bordeaux or commercial lime-sulphur of the strength used for apple summer spraying. The self-boiled spray is made of eight pounds lime, eight pounds of sulphur, to fifty gallons of water. Slake the lime in a barrel by nearly covering with water, add the sulphur by sifting it on the boiling mass. As soon as boiling ceases, cool the mixture with water to prevent lime-sulphur compounds being formed. A mechanical mixture of the lime and sulphur is all that is desired and this is formed by the boiling action in slaking. Spray should be applied about three times: first, about ten days after petals fall, two pounds arsenate of lead to fifty gallons of water,—for the curculio; second, about two weeks later, two pounds arsenate of lead with the lime-sulphur,—for the curculio and brown rot; third, about four weeks before fruit ripens, with lime-sulphur for brown rot.

Experiments have shown that about 90 per cent of fruit that rot on unsprayed trees can be saved by spraying. In one large fruit farm this was found to average one-half bushel per tree, or about fifty cents worth of fruit could be saved at a cost of about five cents for spraying.

LIFE HISTORY AND CONTROL OF CODLING MOTH.

LEON B. GARDNER.

(Awarded third prize.)

The codling moth is the most serious insect enemy of the apple that we have to contend with. It is a native of Europe and has come across to the United States without its natural enemies. It, therefore, requires a great deal of work to keep it under control.

It passes the winter in what is known as the larva stage, spun up in a cocoon ready to change to the true pupal condition early in spring. The cocoons are usually found underneath rubbish, in old apple barrels, or under loose pieces of bark. They are about one-half inch long, oval in form, and gray in color. About the middle of May most all of the adult mothers are out. They fly around for a week or two and soon deposit their eggs, usually near the flower. The moth is a delicate little creature. About three-eighths of an inch long, with wavy transverse lines on the front wings, the hind parts being somewhat darker, with bronzed patches. They so resemble the bark of the tree that it is almost impossible to tell them from the bark.

By the latter part of May most of the eggs have hatched and about 80 per cent of the worms have entered the apple at the calyx end. The worm works its way into the apple, eating as it goes. When full grown it comes out at the side. They then spin up a cocoon and remain there until about the middle of July, when the second brood of moths come out. They, as the first brood have done, soon deposit their eggs. By the latter part of July most of the adult worms of the second brood are out. This time about 80 per cent of the worms enter the apple at the side, usually where two apples touch each other, or where an apple and a leaf or an apple and a branch come in contact.

There is sometimes a third brood in Michigan. If so, it would come about the latter part of September.

Now as I have said there are two periods of actual development. One about the first of June and the other about the latter part of July. It therefore remains that there are two periods at which spraying will be most effective. The first spray should be about the time the stamens wither, using a poison of course. One should take the greatest care to see that they get the spray into the calyx cap. The second spray should be about the first week in August, taking great pains to get the apples thoroughly covered with the poison.

FIRE BLIGHT AND ITS CONTROL.

A. W. EIDSON.

This disease is caused by the bacteria bacillus amylovorous. It was first observed about 1780 by William Denning. It probably occurred as a disease of the wild fruits of North America before cultivated varieties were introduced. For a long time it was confined to the regions east of the Rocky Mountains, but in 1903 it appeared in California.

Fire blight is the most destructive disease of the pear, and is also a serious disease of the apple. Not only is the crop lost, but also parts or even the whole tree is destroyed. When you stop to think what a bearing tree is worth, you get some idea as to the loss from this disease.

The pear blight is most commonly noticed during the early part of the season, throughout the blossoming period of both the pears and apples. From two weeks to one month from the period of pollination the blossoms and tips begin to wilt and show signs of blackening and the death of the spurs and branches upon which flower clusters were born. Upon the pear the blight may continue down the spur or branch entirely killing it as the disease progresses. If the spur which is affected is on a large branch, or on the body of the tree, the disease will work down the spur into the branch or body and cause a deadened portion, but not killing the branch, this is called a canker. This may, however, extend entirely around the affected part thus girdling it. Many of these cankers live over winter and in the spring a sweetish liquor oozes forth which is filled with the bacteria. This liquid attracts bees and they get completely covered with the bacteria; then they light on the blossoms and leave some of the bacteria. This accounts for the disease starting from the blossoms.

The disease being caused by bacteria, thus being entirely inside the tree, makes it impossible to control it by means of a spray. The only means of control are to avoid a succulent growth, this being favorable for the growth of the disease. Destroy all sources of infection, clean out all cankers, make a regular inspection of every tree in the orchard at least once a week throughout the growing season; beginning as soon as the petals begin to fall. It is sometimes necessary to inspect every day, cutting out all affected twigs and rubbing off all affected spurs and water sprouts as fast as they start.

In cutting out always cut about twelve inches below the affected portion and disinfect well with a corrosive sublimate solution (1 to 1000). The corrosive sublimate is sold in tablet form, and to make up this solution dissolve one tablet in one pint of water.

All varieties of pears are susceptible to the disease, however the Bartlett, Seckel, and LeCont are much more susceptible, and the Kieffer is the least susceptible.

THE PEACH BORER.

HARRY G. TAFT.

As the Peach Yellow is the worst disease of the Peach, so the Peach Borer is the worst insect enemy. It also works on plums, prunes and cherries.

There are four stages in the life-cycle of this insect; adult, egg and larva and pupa. The adult is a small moth having clear wings which are covered with metallic blue and orange scales. The eggs are laid between October 15th and June 1st, generally on the bark. The larvae or borers, which are the ones that do the damage, are soft-bodied and are grayish-white with brown head and legs. After entering the tree they work first in the bark and later find their zone of action in the cambium layer, between the bark and the wood near the crown of the tree. As the cambium layer is the living part of the tree, it can readily be seen that unless they are removed, these borers will soon girdle the tree and kill it. They usually work either a foot above or below the ground, but in old trees, they are found in the highest branches.

They pass the winter in the larval state, sometimes being nearly full-grown. In the spring, they resume feeding and after attaining their growth, they spin their cocoons near the mouth of their burrows.

During June, the adults begin to emerge from their cocoons and lay their eggs. In this fact lies the greatest trouble in the destruction, for if they were all laid at the same time, it would be an easy matter to control them, but extending through September as the period does, about the only method to be employed is the boring.

The dirt is dug away from the tree and all the larvae are destroyed, these are easily found as the presence of the larvae is indicated by masses of gum.

Many remedies have been tried but only a few have been successful; among the successful ones being wrapping tobacco waste around the trunk, or using heavy paper in the same way. This prevents many from gaining lodgment.

The boring should be done in both spring and fall and should be done very thoroughly. The dirt should be left away from the tree and the bored wood should be painted with a mixture of white lead and pure raw oil. This results in the killing of the tender larvae by the action of the sun and still prevents the drying out of the trunk. Another method is to bank the dirt about a foot high around the tree and in this manner forcing the insect to bore in the tree after which they can be removed much more easily.



Six Bushels of Peaches to the Tree.

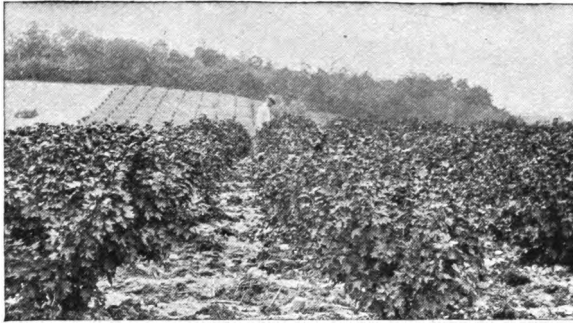


Fruit Harvest. O. W. Braman, Kent County.

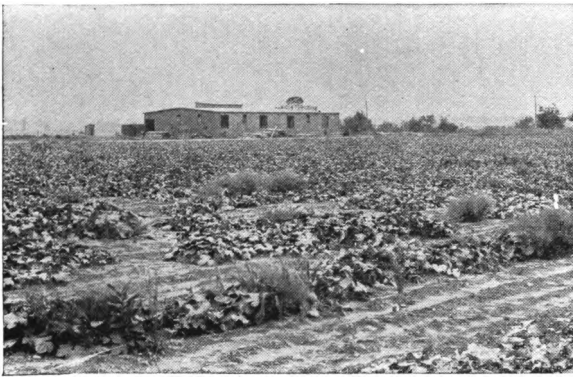


Fine Vegetable Display, Mecosta County.

Courtesy of the West Michigan Development Bureau,



Currants Return \$200 an Acre.



Cucumber Growing. V. R. Davy, Osceola County.



Bees and Fruit Go Well Together.

Courtesy of the West Michigan Development Bureau.

THE SAN JOSE SCALE.

E. W. DEGRAFF.

The San Jose Scale was first described in 1890, by J. H. Comstock, who was at that time investigating and describing the different insects that were troubling the fruit growers in California. His attention was brought to bear on this insect by the people of the Santa Clara Valley. They were losing many trees and did not know the nature of the insect or how to cope with it.

It was noticed that in the localities where trees were planted that had been imported from northern Japan, the effects were most serious. So destructive was the pest around San Jose that the people began to call it the San Jose Scale. The scale did not originate there, as many people suppose, for its native home is in northern China. But it gained its foothold in America at that place by being imported along with the nursery stock that came from the above country.

In 1893 some nursery men in New Jersey bought infected stock from California. This gave the insect a foothold in the east. It then began to spread westward from there and eastward from California. It is now found in nearly every state in the Union and in southern Canada.

A female scale in the Spring will give birth to about 400 young, half of which are females. The young female has no wings or eyes but has legs, antennae and a sucking beak called proboscis. Soon after its birth it begins to scramble around until it finds a suitable place on the bark into which it sticks its beak and sucks up the sap. This also serves to anchor it to that particular spot until death comes. When it has found this spot and has fastened its beak into the bark, it curls its legs and antennae around itself until it is almost circular in form and then begins to excrete from every part of its body a waxy fluid, which in the course of time becomes papery-like and acts as a sort of armor.

The young male has eyes, wings, legs, antennae but no mouth parts to speak of. Its purpose in life is to mature and mate with the female. This it does when it is from 32 to 40 days old. It then dies.

There are four generations a year. If each female gives birth to about 400 young there would be at the end of the year, if nothing happened, a little over three and one-fifth billion scales which owed their origin from the first female of the year. Fortunately for the fruit grower not all of these live, but an idea of the uncommon prolificacy of this insect is seen and it should act as a warning against inefficient spraying or lack of attention given this destructive pest.

To control the scale, spray with a solution of Lime and Sulphur but spray thoroughly. Although the best time to spray is in the Spring very good results have been obtained when fall spraying was done. The reason for this is that as a rule the farmer or fruit grower has more time and can spray more thoroughly in the Fall than in the Spring. The main thing is to spray thoroughly and as often as possible. The increase in perfect fruit will more than balance the cost of the spray.

ing. This should serve as an incentive for every man in the community to spray and thereby help in the fight of eradicating one of the worst pests of the fruit grower.

THE SCAB OF APPLES.

FRED W. CRYSLER.

Fruit growing is oftentimes seriously interfered with by plant diseases, so much so that, in order to be a successful fruit grower, one must have a general knowledge of their nature, means of perpetuation, mode of attack and also how they affect the host.

Now plant diseases are caused by lower plants, very minute, called fungi which prey upon the higher plants, the hosts, interfering with the normal functions of their parts or destroying them altogether. Fungi are reproduced by spores which answer the same purpose as seed do in the higher plants. But the growing injurious part of a fungus is known as the mycelium which, in case of scab, develops beneath the skin of the leaf, twig or fruit and comes from a little germ tube sent thru the tender skin from a spore.

Scab is one of the worst diseases of the apple and appears in the spring on the young leaves as slight elevations of a lighter color than the surrounding surface. Soon there appear little tufts or olive colored patches on the leaf surface. These are the fruiting branches of the fungus and at the ends of which spores are born which are carried by wind, rain or some other way to infect other leaves or fruit.

In this stage of the disease the function of the leaves is interfered with so that the plant cannot get sufficient food required for the time nor for future growth and fruit. In severe cases the leaves become deformed and fall prematurely leaving the plant less resistant to future attacks of scab and other diseases. But perhaps the most serious effect in a financial way is in the case of the fruit. With this a spore from a diseased leaf alights on the young fruit soon after the flower has fallen and if the weather is cool and moist the spore germinates and sends out a little germ tube which forces its way thru the tender skin and proceeds to form a new mycelium and reproduce a new crop of spores. The result is the young tissues of the fruit fails to develop and the lop-sided, deformed and badly cracked apple remains to advertise the willful neglect of the would-be fruit grower. Scabby apples are worthless for market purposes and but little for other purposes.

The injury from scab does not stop here as the ruptures in the skin of the fruit afford a fine entrance for rots known as bin rots, one of the worst of which is pink rot. This rot gains entrance through the broken skin of the fruits as it is unable to penetrate unbroken skin and this condition is furnished by the scab. It develops most rapidly when the scabby fruit is stored in large quantities in sheds, cellars or piles where atmospheric conditions are damp and close. Here it completes the destruction begun by the scab, and even when fruit attacked by it is

shipped has been known to destroy carload lots in the very few days in transit.

Besides the attack spoken of in early season there is another attack of scab appears in August and although this may appear slight its result is very severe as this gives the chance for pink rot to get in later in the season. This attack also furnishes the spores to attack leaves later in the season so that the disease may be carried over winter and continue the devastation next season. Of course the manner in which winter spores are produced is quite different from the summer form but the result is the same and all tends to perpetuation of the disease.

From what has been said it is evident that control must begin in the early spring before the disease has got started again and in very bad cases spraying should begin before the leaves come out, spraying with lime sulphur solution, or bordeaux. Give the following sprays as recommended in the spray and practice outline of the "State Experiment Station" mixing in a generous lot of your own good common sense and apple scab can be controlled if not completely eradicated from any locality.

HORTICULTURE IN THE WEST.

H. LEE BANCROFT.

It was my good fortune, during the last year, to visit some of the great fruit districts of the west, including the Yakima Valley, Hood River and Grand Junction, Colorado, districts. Of these three great districts, I spent the most time in, and became best acquainted with, the last named district which is located in western Colorado.

Grand Junction lies in the valley of the Grand river and the fruit district occupies about 200 square miles of the valley. The land is mostly a clay loam and is divided up into 5, 10 and 15 acre tracts and only intensive farming is practiced.

Standard trees in the best orchards are set about 40x30 feet or 40x40 feet. Between the rows the common crop is alfalfa, which grows to perfection in that climate. The trees are pruned heavily in the fall or early spring. When the crop sets and grows to the diameter of an inch, they are thinned, if needed, and throughout the season this thinning is kept up to insure a large crop of a medium sized apple. Spraying is practiced in every orchard, the common spray being, lime and sulphur, early spray for San Jose which is rather scarce there and six sprays for the codling moth which is their worst insect pest. High power spraying machinery is used almost exclusively. Only the very latest and approved methods are employed in their picking and packing, great care being taken in the handling of the fruit. One rather striking example of their foresight is seen in the shaping of the young trees, the branches being so pruned that openings are left so that ladders can be set up in the tree without opening up the tree and these openings are used each year for the ladders. The trees are all low headed, and have open centers to admit plenty of sunshine which is the big western asset.

Bushel boxes are used in the packing, these boxes are inspected and shipped by the "Fruit Growers Association." We find that the cost of shipping a bushel of apples from Grand Junction through to Chicago is seventy-five cents. We can send a bushel of apples in for twenty-five cents at the highest and this margin of fifty-cents alone ought to insure the success of Michigan apples.

One of our best known real estate men after traveling over twenty-three thousand miles, by automobile, covering New York, Michigan and all of the great western fruit growing states, after looking the ground over thoroughly invested in ten thousand acres of Michigan land. We ask why he did this and we note the following facts:

Michigan has as good land at a price that is not one-fourth of that charged in the west, our fruit is as good in flavor, if not better, our taxes are lower, we are not troubled any more by frost, our rain takes the place of the heavy irrigation taxes and we have the great advantage of being near the markets. If we just think a little, Michigan is not such a bad fruit growing state after all.

ORGANIZATION IN MICHIGAN.

RALPH G. KIRBY.

The many advantages of co-operation brought out by the Western Apple Growers have stimulated organization all over the United States and Canada. The great advantage of co-operation is enabling the growers to ship in car-load lots, and thus avoiding the commission man, they can often deal directly with wholesale fruit houses all over the country. By using iced refrigerator cars the loss from decay is very small, and the fruit will nearly always reach the market in fine condition. The small grower can not raise enough fruit at any one time to afford iced cars. A competent manager must be secured, one who knows the markets, and understands transportation, a man that is a buyer and a fine salesman. Such men are rare, and many co-operative associations have failed, because they thought they could not afford to hire an experienced man.

The growers can establish a brand that will soon be known in the markets, and thus will always bring good prices. If the boxes are all uniformly packed, and the association gains a reputation for honesty in all its dealings, such a reputation will aid in disposing of their fruit at the best market prices.

Better business methods are always possible, in dealing with the buyers, transportation companies, commission houses and in buying baskets, paper, etc.

A good manager can often save much money by ordering large quantities of material from reliable companies, when some of the farmers might incur serious loss by purchasing inferior stock.

By organizing, a community may make use of new varieties of fruit that one individual could not take the risk of planting. Each member might plant a few trees and in the aggregate they would have enough

of that variety to give it a fair test and place a sufficient quantity on the market to advertise it before the public.

Better care of the orchards is insured, as the farmer must raise good fruit to belong to the association, and thus he will cultivate, spray, and prune his orchard, doing all that is necessary to produce a good quality of fruit. His product must reach the standards of his association or it is not accepted for shipment.

Business men will finance cold storage plants, if the community raises good fruit, and these plants may be of great value to the farmer, and if the co-operative society can own its cold storage the price of storing will be greatly reduced.

There has been much difficulty in organizing these societies for the following reasons.—Independent growers may raise better fruit than the whole community can produce, and the members may fail to stand by the association and its manager.

A bad year with little fruit will often completely disrupt the working order of the association.

However, in nearly all cases organization has given greater stability to the fruit business, and with co-operation, Michigan will take a place as a fruit producing state second to none in the Union, with a product of quality far exceeding the apple of the west.

ORCHARD CONDITIONS IN NEW YORK.

EDWIN SMITH.

Upon finishing last year's school work, I was in the usual condition of the college student, i. e., broke, so that I was unable to spend the summer in western orchards as I had intended to do. Then I decided that a fellow ought to go around and see the orchards at home first, anyway.

You know what excellent orchards I found in western Michigan, and what a fine showing of fruit they contained. I saw some equally fine peach orchards along the shore of Lake Erie in Ohio. Leaving Buffalo, I decided to tramp through the orchards of western New York to my home in Lodi, Seneca county. My pecuniary state of affairs scarcely forced me to do this, but I thought it the best way to get acquainted with the orchard conditions.

From Buffalo I walked northeast to Lockport, not passing through any good orchards until after I had reached the lake slope north of that city. Here I came into the wonderful Olcott peach region, perhaps the finest peach district in the United States. They there have the "Yellows," "Little Peach," and other diseases that Michigan growers have to contend with, but they are not so virulent but that the trees live to attain a bearing age of from fifteen to twenty-five years. Orchards are set in blocks of from five to one hundred acres.

Going east along Lake Ontario from here, I passed through the towns of Summerset, Middleport, Medina, Albion, Brockport, Hilton and

Rochester, a route that took me through the main pear and apple regions. Orchards are here set in blocks of from fifteen to thirty acres, some larger. The predominating varieties are the Baldwin and Rhode Island Greening.

The immensity of the apple-growing industry of this eastern region was impressed upon me by the presence of one or more large chemical cold storage plants in each village I passed through. In Hilton, a village of six hundred or seven hundred inhabitants, I found a magnificent storage plant, having a capacity of nearly seventy thousand barrels. When we consider that only a small percent of the apples grown in this vicinity are stored, then we realize that the west may cater to a fancy appetite of those who can afford luxuries, we now are convinced that our portion of the United States is the fruit-growing region that feeds the people with apples, for I was told that last year this little town of Hilton alone shipped more apples than either the state of Washington or Oregon.

While on my trip I continually found heavy plantings of young apple trees, mostly having peach tree fillers. We hear a great deal these days about new plantings being over done, but I do not think there is any cause for worry. In 1889 we find that there were over 120,000,000 apple trees in the United States bearing one and one-sixth bushel per tree. In 1910 we find 300,000,000 bearing trees producing but one-fourth bushel per tree. This shows that there are millions of trees being set in regions that are not adapted to apple growing. Then there is always a demand for choice fruit. From 1850 until 1897 our population increased but 207 per cent, while in the same length of time our consumption of fruit increased 2,000 per cent, showing that new appetites for fruit have been awakened and that this is really an undeveloped field of work for the horticulturist.

Cooperation in New York has been no more successful than it has in Michigan. Our eastern markets are too close to the producers to force them to organize, and that is where the western grower surpasses us,—not that they are any smarter than the eastern people, but there conditions force them to organize in marketing their fruit, or fail altogether. My observations in New York State as well as in Michigan lead me to believe that there are a few things for us to strive after, even if our attempts at co-operating have been in vain. Impossible as they may seem, yet I believe, first, we should strive to establish honest commission merchants; next we should attempt to get honest transportation; and last, and what I believe is most essential in booming our markets, is for each grower to strive to put a little religion in the middle of the barrel and give the consumer an honest pack.

THE USE OF COVER CROPS.

M. T. MUNN.

The use of cover crops in connection with the growing of fruit is closely allied with the fertilizer problem, inasmuch as they are both fundamental factors in soil fertility. The producing capacity of the soil is as much dependent upon its physical or mechanical condition as it is upon the amount of plant food it may contain. The chief factor governing the physical condition of the soil is the amount of humus or decaying vegetable matter it contains.

Nitrogen occurs in the soil in a combined form in humus and decaying vegetable matter and in that form thru the action of bacteria it is changed into nitric acid which unites with other substances and will dissolve soil salts. There are two methods of adding humus to the soil, first, by the application of barnyard manure, and second, and perhaps the better of the two methods is by growing a cover crop upon the soil and plowing it under in the spring.

The principal uses of a cover crop in the orchard or vineyard are as follows: Their growth helps to check the tree growth and ripen the new wood. A cover will catch and hold the leaves as they fall from the trees and will afford some protection. The cover crop itself will make a blanket over the ground and by holding the snow from blowing off, will prevent deep and severe freezing of the roots, and the alternate freezing and thawing which causes serious loss in Michigan orchards located upon the lighter and more porous soils. A cover of vegetable growth over the soil, supplemented by the root system will prevent the washing of the valuable top soil by the heavy fall and spring rains as is liable to be the case on knolls and hillsides. Cover crops also encourage deep rooting of the trees, also catch soluble plant food in early spring before root action begins in the trees, but the most valuable results from the use of cover crops is that they add humus and plant food to the soil.

The selection of a suitable cover crop will depend somewhat upon various factors; a cover crop must make at least a fair growth during late summer and fall; it must be able to withstand the winter and grow vigorously in the spring; it must be able to stand the tramping necessary at picking time, and it should have the power of gathering nitrogen from the air and holding it in the roots. If the soil needs more nitrogen one of the legumes, such as vetch, peas, or the clovers should be sown as they have the power to gather nitrogen from the air so that when they are plowed under and decay the soil is actually richer in nitrogen than it was before. If the maintenance of humus is necessary with soil protection then a non-legumious plant such as rye, oats, or buckwheat will serve although they leave the soil but little richer than it was before, though the presence of the decaying vegetable matter thus added to the soil improves its physical condition and makes it more productive.

Winter Vetch (*Vicia Villosa*) sometimes called sand or hairy vetch

promises to be most valuable cover crop for Michigan. The Delaware Experiment Station found that in four months from seeding, the winter vetch would store up 121.2 pounds of nitrogen per acre, which is equivalent to 757.5 pounds of nitrate of soda, 27.2 pounds of phosphoric acid equal to 194 pounds of acid phosphate, also 85 pounds of potash equal to 171 pounds of muriate of potash. If the winter vetch seed is sown broad-cast, about 25 to 30 pounds of seeds to the acre is required and it should be harrowed in. If drilled in, 18 pounds per acre will be sufficient. It has often been found desirable to sow a bushel of rye or oats as a "catch crop" since the vetch does not make a large growth in the fall.

The ideal time to sow the cover crop is at the last cultivation of the season, allowing it to remain upon the ground until the first working of the soil the following spring when it must be plowed under before it dries out the soil enough to affect the trees. Various factors will influence the management. No difficulty will be experienced in plowing under any of the cover crops if done at the proper time and a rolling coulter is used on the plow. Fruit growers who have not tried any of the cover crops are especially urged to do so as it is the most economical method of fertilizing the soil and keeping it in good tilth.

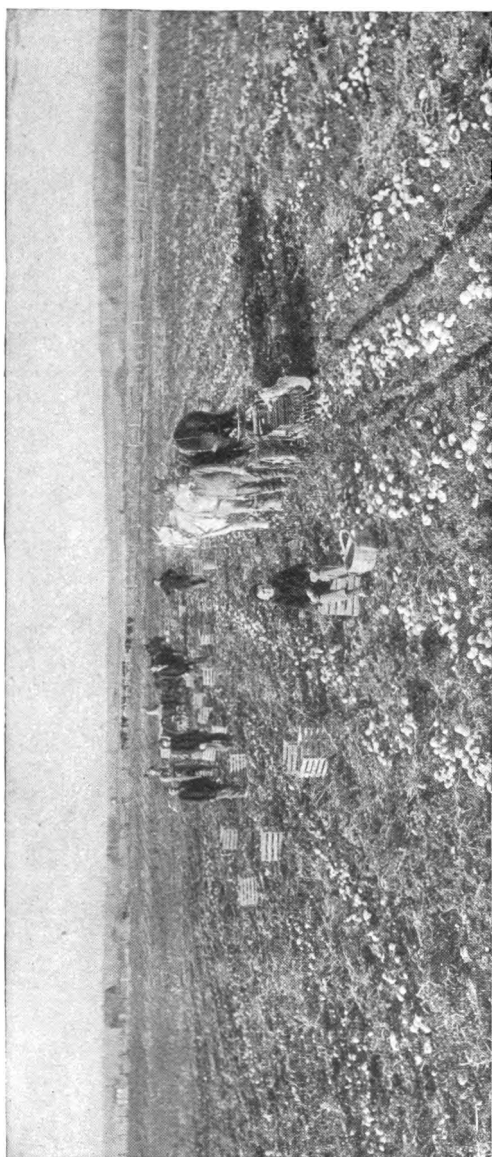
CURRENTS AND GOOSEBERRIES.

J. POMEROY MUNSON, GRAND RAPIDS.

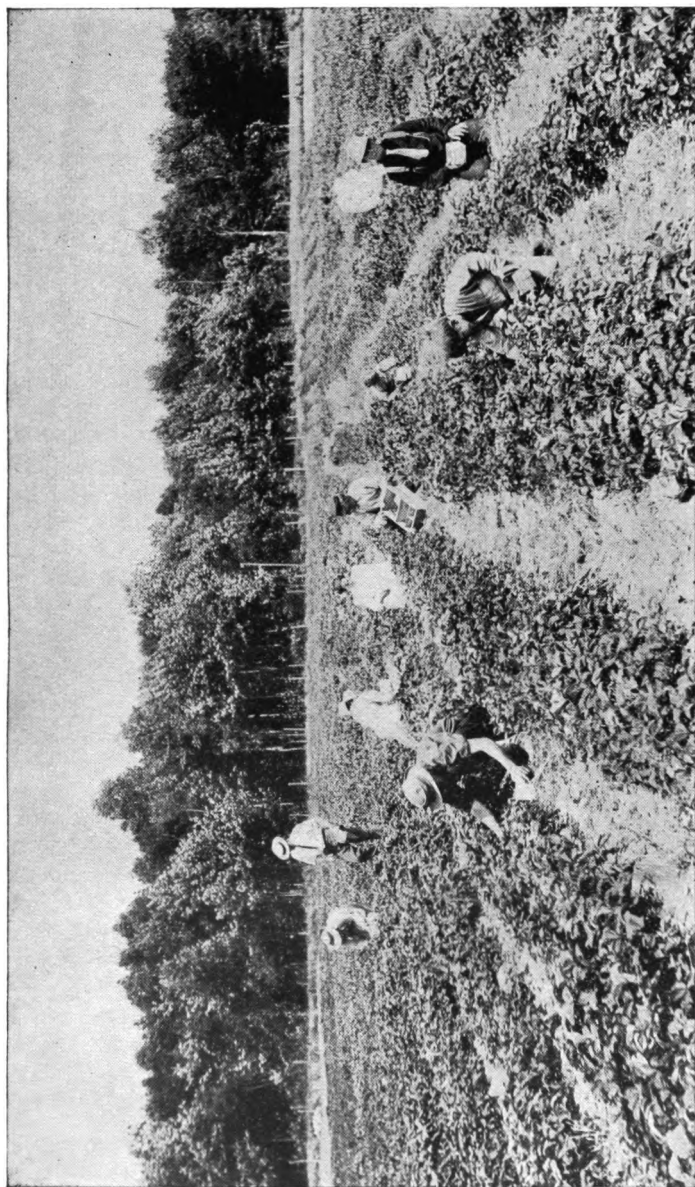
In the discussions at our State Horticultural meetings, for several years back, the major topic has been apples. We have been shown how to select apple varieties and soils, plant apples, cultivate apples, fertilize apples, thin apples, prune apples, spray apples, pick apples, pack apples and market apples. In fact it has been shown conclusively that with average conditions, the possibility of a person who has some acres in Michigan's favored fruit district to become independently wealthy by raising apples, is decidedly rosy. A well grown bearing apple-orchard, is indeed an attractive proposition.

But, unfortunately, there are some of us, wishing an apple orchard, who perhaps do not have our land paid for, or perhaps need some income producing crop to depend upon, while the apple orchard is developing. To such as these, the early maturing small fruit may prove desirable. Gooseberries and currants, for several reasons, seem to be peculiarly adapted to such use. They do well with the high fertilization used on young fruit trees, and succeed with the partial shade when planted among the trees. They mature early, and bear well, and the picking is not laborious nor the season long drawn out. The markets of late years at least, have been good and prices remunerative. Gooseberries and currants, have long been highly regarded as a dessert fruit in England and Holland. Their varieties grow large and sweet. Here, gooseberries are regarded wholly as culinary fruits.

In the early horticultural development of the U. S., both Currants and Gooseberries were found growing wild in many regions of the



One Thousand Five Hundred Bushels of Potatoes on Land that Cost \$150. Otway C. Mendenhall, Newaygo County.
Courtesy of the West Michigan Development Bureau.



Strawberries that in 1910 made Returns at the Rate of \$707.66 an Acre. George Durance, Charlevoix County.
(Courtesy of the West Michigan Development Bureau.)

northern states. The fruits of these were for the most part small and meagre and often prickly. They were flourishing enough, however, to lead the pioneers to infer that this class of fruit would do well here in cultivation. Many sorts of the English gooseberries and currants were given a tryout here. The English varieties of gooseberries, never proved a success in this country, owing principally to mildew and such diseases, for which the change of climate was responsible.

The Houghton gooseberry was grown from seed from the wild sort, and was first introduced in Lynn, Mass., in 1847. The Downing seedling, from similar parentage, was first introduced by Chas. Downing in 1853.

Our red and white and black currants of commerce, are all English varieties or developed from them. The so-called flowering currant, represents the American sort.

Currants and gooseberries are propagated by means of cuttings or by layering, and are generally planted permanently when one or two years old. By disbudding at the time of planting cuttings, the plant may be made to assume a tree form. This gives, perhaps a better appearance to the plant, but it is not as desirable as the bush form, from the profit standpoint,—that is what we are the most interested in. The trunk of a gooseberry grown in tree form is quite liable to become broken, and with currants,—the borer if he works at all would destroy the entire plant.

Gooseberries thrive in good strong well-drained clay loam and will welcome almost any amount of barnyard manure. In an open field, we began by planting five feet apart. But later planted six by six and now would regard seven or even eight feet as more desirable. Among cherry and plum trees, planted each way between the trees.

Gooseberries and currants start very early in the spring,—almost it seems before the frost is out of the ground. For this reason we like to plant in the fall, so as to give the plant a chance to start early. At the time of planting, the broken roots are cut out and the tops cut back so as to make a skeleton for a saucer-shaped top. Cultivation should start very early in the spring, and should be done thoroughly and repeatedly, especially in the bearing plantations, as the fruit should soon so weigh down the branches as to make late cultivation well nigh impossible.

The ever present insect enemy of these plants is the currant worm. It and also the scale is held in check by early thorough spraying with lime and sulphur and arsenate of lead. The worm may not show up at all, during the season, after this spraying, but the bushes may well be often inspected, and when there are any evidences of the worm, an application of Paris Green and Hellebore with a powder gun will make short work of the worms, if done promptly.

After the fruiting season, mildew sometimes attacks the leaves, causing them to drop. This affects the development of next years fruit buds, so it is well to spray at this time with Bordeaux mixture to keep down the fungus. The thorough cultivation is also resumed after taking off of the fruit, and kept up until August first. A cover crop of crimson clover or oats may well be sown about this time.

Gooseberries are picked while still green, and before they ripen

enough to become soft. As they are generally sold by weight,—and any fruit increases greatly in weight during the last days of ripening,—we aim to pick as late as possible and pick green. In picking we furnish pickers cheap leather gloves and low crates. They place the crates underneath the branches and strip off the fruit. This mixture of fruit and leaves is then put through the fanning mill, and each picker credited with one-half cent per pound for their fruit. An industrious boy will earn fairly good wages at this rate. A foreman has charge of the gang of pickers, and inspects each picked bush, before assigning the picker to a new one. From one lot of 2,000 plants, 1.65 acres, in their fourth season, we picked last season 116 bushels, which sold for \$290. Just 10 per cent was paid for picking. We plant both Houghton and Downing, and find them both productive and satisfactory.

In currants we have tried many varieties of the red sorts. We do not like the Fay's Prolific, but have lately planted Wilder, London Market, Prince Albert and some Pomona. Victoria is an old standby with us but does not grow as large as the other sorts mentioned.

We have a few white currants, but there is scarcely any demand for them. Black currants sell at a large price, but do not yield enough to be very profitable. If one could get a black currant which would yield heavily and be otherwise desirable, there would be money in it.

The currants are generally picked in quart boxes, although if we sell at the canneries, they go, by the pound. The price of late years has been less than for gooseberries. There is a growing demand for either class of fruit. They require but one picking in a season, and not so much pruning or care as do raspberries, blackberries and other small fruits. A plantation once started, does not require replanting, as soon as do some other small fruits. We have a patch of Houghton gooseberries planted in 1894, which is bearing very productively, and sold at the same prices as Downings, the past season.

Now Gentlemen,—I do not want you to go home and proceed to tear out your bearing apple and peach orchards, in order to make a plantation of gooseberries and currants. I do not advise it,—but with right conditions of soil and location and market,—the raising of gooseberries and currants may well be classed as a splendid and profitable way of paying expenses during the development of tree fruits, and with us a very satisfactory crop in itself.

DISCUSSION.

A Member—Do you trim these gooseberries like other fruit?

Mr. Munson—Gooseberries grow on two-year-old and three-year-old wood. We prune some. The branches will get broken down by driving over with spray pump, and the branches that seem to be growing out we cut out.

A Member—Can you manage to keep the sod from among the mulch?

Mr. Munson—Yes. We can do it all right, but we get after it very early in the spring with a cultivator. The gooseberry and currant growth starts so early in the spring that one should get right after it as soon as possible. If the cultivation is neglected during the first few weeks, the new growth is so rapid that there is considerable difficulty in weeding it out. Sometimes mildew comes on the leaves after the fruit

is off. But that can be obviated by spraying with Bordeaux. The leaves should be kept on as long as possible so that the new fruit buds will be formed during the latter part of the season.

A Member—What about slipping plants?

Mr. Munson—We usually buy ours, but you can take them off in the fall—make cuttings in the fall—and bury them and then plant them out in the spring. Bury them in bunches in the ground with the larger end up and cover four or five inches from the top so as not to dry out. In the spring remove them as soon as the frost is out of the ground. They can be taken up about the first of May and put in nursery rows at that time. The ends of the cuttings should be well calloused and the roots ready to start at that time. The cuttings should be six or eight inches long.

A Member—Do you grow black currants?

Mr. Munson—Yes and I am able to sell them at good prices. If you can find a black currant that bears well it will pay to grow them. Usually they do not bear very heavily. None of my family will touch them but when you do find those who want them, they want them bad. The English like them and some other foreigners.

A Member—What about the white currants?

Mr. Munson—We have some white currants but there is practically no demand for them. We can get no larger prices for them than for the red ones.

A Member—What varieties do you advise?

Mr. Munson—We use the Victorias because they have stiff stems and are not attacked by borers. We have been using Wilders and some other varieties like that. We put in Perfection this year.

A Member—Do you recommend Downing gooseberries for commercial purposes?

Mr. Munson—We find that the foliage is thicker and thorns stiffer than the Houghton, making it harder to pick but the fruit is larger and does not get red. Canners do not like red berries.

A Member—We would like to know in regard to the spray that you use, and if you use a commercial fertilizer. If so what kind?

Mr. Munson—We spray early for the scale and for the currant worm. The best remedy for the scale is lime-sulphur and we use it just the same as we would for apples or peaches. Then we put into the solution, two pounds of arsenate of lead to fifty gallons.

A Member: That must go on in the dormant state?

Mr. Munson—Yes, this lime-sulphur goes on just as the buds are starting and then there must be some poison for the first currant worm, which at first is very small. As to commercial fertilizer we never use that as we are where we can get plenty of manure.

A Member—Do you do any spraying after the worms come out?

Mr. Munson—A few worms will come out on scattered bushes and these can be taken care of with dry powder—Paris Green or hellebore, put on with a powder gun.

Question—You do not use arsenate of lead at that time?

Mr. Munson—Not later than the early lime-sulphur spray.

Question—How much cultivation do you give in the spring—how long? State how you cultivate in the spring?

Mr. Munson—We plant them out so that they can be cultivated both

ways, same as corn or potatoes, six feet apart. Cultivate in all directions thus eliminating as much hand work as possible. We cultivate just as late as we can and not injure the fruit. When the plants are smaller one can cultivate longer because there is more room between the rows. But later when the bushes bend over one is liable to do more harm than good and it is time to stop.

Question—What kind of cultivation would you recommend?

Mr. Munson—Plowing and cultivation. You can plow with a gang plow for a year or two, turning the manure under. What kind of soil do you have? Rather heavy soil, some loam.

Question—What about the Perfection, is that a good variety and will it keep on the bush?

Mr. Munson—You can keep anything on the bush if you keep the direct sunlight from the fruit.

Question—Have you the London Market?

Mr. Munson—Yes, we have the London Market, and the Prince Albert, and like them very much.

Question—How long will most of the currants hang on after getting ripe before spoiling?

Mr. Munson—They will last a long time. The only thing that is against them is the hot sun. If not covered up they will burn. They are like gooseberries in this respect.

Question—What causes the mildew on currants?

Mr. Munson—Hot weather and damp are conducive to mildew, I suppose.

Question—Do you know anything about the Wilder currant?

Mr. Munson—Yes, this is a good currant. It yields well.

Question—I would like to know if this first spraying would have any effect on the mildew which comes on the berry later?

Mr. Munson—Yes, I think it would. We have not had much mildew on ours since we sprayed. We like to keep the leaves on as long as possible.

Question—Do you not have to prune your Wilder more than the others?

Mr. Munson—I have not noticed that we do.

A Member—How do you renew them when they get old?

Mr. Munson—We prune them every two or three years.

Question—Don't you have new ones coming on?

Mr. Munson—Yes, sir.

Question—What is your rotation?

Mr. Munson—About seven year's rotation. However, we have currants that are fourteen years old. We cut them out severely, allowing new canes to come up. We prune in the summer time after the fruit is off.

A Member—We have a currant patch in our locality and the owner carries on a scientific system of pruning, so I consider it, running over it seven to ten times. He heads that in at two feet high, and forms a head there, and then prunes back to about a bud every year. He furnishes nursery men with his prunings, so that in reality he gets two crops a year. He makes \$400 an acre—\$200 for the cuttings and \$200 for the fruit. The fruit is the very finest. He resorts to severe pruning. In this case I speak of, they have no branches and he can pick eight

or ten crates a day. Of course you must thin out some of that head after a while, but he does have nice fine fruit.

Question—I would like to have a description of the Wilder currant.

Mr. Munson—It is rather hard to describe currants, but the Wilder has a long bunch of good sized berries and they run more nearly uniform in size than other varieties.

A Member—We have something like 700 now set out, but as yet have not come to maturity, and we are anxious to know just what we should do with them. I hear that the only trouble with the Wilder is that it is a little early and gets frosted.

Mr. Munson—We never had that trouble.

ADDRESS OF PROF. GREEN, OF THE WORCESTER, OHIO, EXPERIMENT STATION.

Mr. Chairman, Members Michigan Horticultural Society:

It is with great pleasure that I meet with you here, and while I came in late, I have already met those I have met in years gone by, and I hope to further renew this acquaintance, as well as make new ones.

I desire to say that the State Horticultural Society of Ohio has a very warm feeling for this Society. We all look to Michigan for increased knowledge and for instruction. We have had some of your good men with us, and we have sent some of our men to you. I wish we could get better acquainted, and I am sure that we will. I have not come direct from our State Society, but I know that our Society would like to extend greeting and wish you well not only in this meeting but throughout the whole year.

We have some fellow feeling, some fellow experiences. I understand that you have been cut off from your State appropriation. We have passed through this experience ourselves, I do not remember just how many years ago it was, but five or six. The Governor found that it was unconstitutional to give our Society a thousand dollars a year. At first we were about ready to give up, thinking that without official support our society would go down. But after a time we found that we could paddle our own canoe, and today we are much better off financially and in membership than ever before. It is the same old story, that where there is a will there is a way, and it is the same with societies as with individuals. It so happened that a member of the experiment station was secretary and then the station allowed him to act as secretary without pay. We had long been talking about a secretary who would give all his time to the work, and now this man who has as much time as is necessary, devotes as little time as he can, most of his time being occupied for the Station. We do not have as large a membership as you do, but we can not get it. We have found out that by helping ourselves, we are improving in every way.

There is a great deal of interest at present in Ohio as well as all over the country in horticulture. But the greatest interest is in the apple crop, and this is true over the entire country. I will speak of one

feature of this that is really the most interesting to us of any, that in one part of the state, in some of the southern counties, where the land is naturally not very good, and very hilly, and not adapted to much else than fruit culture, years ago they had a great many orchards planted, twenty or thirty years ago, but most of these orchards standing now have been abandoned; in fact there are practically no orchards in that region that are not at least twenty years old, because none have been planted within the last twenty years until the last two years. The apples were marketed by flatboat down the Ohio and Mississippi Rivers. With this kind of marketing and the insects that came, the old orchards were abandoned, and within the last few years some of the old orchards have been all cut down, showing that they were thoroughly abandoned. People thought that it was not worth while to prune or fertilize or spray. The matter was considered by the Station, and taken up by a few individuals and found in the last two years that these orchards have been so reclaimed that last year there were 200,000 bushels of apples sold from one particular neighborhood. This work of regeneration is now going on all through that section. I do not believe there is another place in the whole country where there has been so much interest taken in reclaiming of orchards as here.

As to the matter of spraying, I will not say anything—I believe this is yet to be discussed here, only to say that almost all the orchardists are using the lime and sulphur. There is, however, a difference on this point, some stick to the Bordeaux mixture, but very few, however. Nearly all are taking up the lime and sulphur, because they must use that to get the scale, but also for the reason that they get much finer fruit, in appearance. The work of pruning has also been taken up very thoroughly, as it must be, because when an orchard has been neglected for fifteen or twenty years, there is much to be done along that line. Then there is one thing that we have just begun to become interested in, for we have had exactly the same conditions there that you have here in the matter of packing of fruit, but we saw that this must be changed if we were to get the most satisfactory results. We have found that even spraying is not all—we must thin as well as spray, in order to get the most satisfactory fruit for packing. While many have not taken this up, yet, it is exciting more and more interest.

In the matter of packages, there does not seem to be any settled conviction in the minds of the people, and many are using the barrel, and will use it for some time to come.

We are also having remarkable results in the use of fertilizers. I doubt if there can be many sections in the country where such wonderful results could be obtained, and it is acknowledged now by all the growers there that the use of the fertilizers is just as essential as the use of the spray.

A Voice—Commercial fertilizers?

Yes, and barnyard manure, but it is not used so very much because of the scarcity. A few years ago when I was here visiting this Society I had something to say about the comparative merit of mulching and cultivation. I do not care to enter into that again, not because I would stir up sedition as I did before, but I do not care to take up the time for it. Growers believe in both methods, but it can hardly be said to be an open question in Ohio. Some are practicing both methods on

the same orchard, but such a case is the exception. However, in southern Ohio where the land is stiff to cultivate, they can do but one thing, and that is to mulch.

There is a good many believe in the combination. This can be used on quite hilly ground and to good advantage. I haven't modified my views very much—I am open to learn by the experience of those who are doing experimental work—this is what all engaged in experimental work should do—be in a frame of mind to see and accept that which is the truth. I believe in both. I believe in using the method that is best for the particular condition and I know positively that both methods are good. I may say, however, that in Ohio, the majority do not use either method as they ought to. That is a confession that I am willing to make, because I believe it should be understood; that the failure of either method is because of the failure to do the work right. A good many of our growers believe in cultivation to such an extent that they cultivate without cover crops, and some people believe in mulching to such an extent as to depend on it altogether. But there are others who believe that a little bit of mulch and a good deal of pasturing and cutting of grass for hay answers just as well as any other way. Of course this means failure. The same thing that you have here comes up there—will there not be an over-supply of fruit in a few years? So far as we are concerned, we can not get an over-supply, because we haven't half as many acres in orchard as we had twenty years ago, and many of the orchards planted then are in such a condition that they can never be of any value as orchards commercially—that is, the old commercial orchards. So do all the planting we will, we can not, until the new orchards come into bearing, be able to anywhere near supply the demand. Then when we consider, further, that a great majority of the trees planted do not come to maturity, into bearing, and many trees planted by men who do not realize what it means to take care of trees, not one-tenth of the trees planted will come into bearing properly, it seems to me that there is no use for having any fears of over-production.

The need of co-operation is as great with us as with you. We have done a little along that line, enough to find that it works, but our orchards are now so scattered that we can not do very much except in a few neighborhoods, but I believe that we must come to that. And I believe that your worthy secretary's words this morning are all true, and apply as well to Ohio as to Michigan. In a word, when you get things going here just pass on your experience to us, and that will help us out in Ohio.

I will be glad to meet personally as many as possible, but would like to see you go down to Ohio, although our meetings are held away off in the other corner of the state, but the conditions are just right for one of the most enthusiastic meetings we have ever had.

A Member—Do you have a compulsory spraying law over there in Ohio?

Mr. Green—Yes, but it is of such a nature that it is of no effect, because there is no way to enforce it. It is a dead letter.

WHAT MEANS CAN WE EMPLOY TO MAKE MORE PROFIT.

CHARLES A. PRATT, BENTON HARBOR.

Fruit growing in early days in this country was largely incidental to general farming. Orchards were planted by farmers whose main business was the growing of grains and cereals, live stock, poultry, etc. In recent years the business of fruit growing has gradually become a specialty. The work has been taken up by fruit men who are specialists in this line and who devote their entire energy to the growing of fruits. Among fruit growers are specialists who grow only one sort or one type of fruit, as, for instance, peaches, pears, apples, grapes, small fruits, etc. The reason for this is largely the demands of intensive methods. Intensive fruit growing requires that everything shall be done for the tree or vine that it will pay to do. The object of the intensive fruit grower is to grow the greatest amount of salable commercial fruit per acre, of the best quality which can be grown with profit. To accomplish this result location, pruning, spraying and cultivation must be carefully studied and practiced, and the fruit after it is grown must be properly picked and packed and marketed to the best advantage. The successful fruit grower must be ready to utilize, at all times, the results of scientific investigations in agriculture.

The successful fruit grower, in the first place, must be a good general farmer; he must understand all about teams, the use of tools, plows and harrows, and the methods of preparing land, seeding and cultivating. He should have some knowledge of chemistry so as to know how to buy and mix his fertilizers and study the chemical needs of his crops. Knowledge of plant pathology and physiology is essential, and he must keep fully abreast with the latest methods of defending his plants against disease. He must also be an entomologist to know every bug or insect which commonly attacks his crops. He should know fruits and fruit trees thoroughly, at least, all the species which he grows; he must be familiar with the merits and defects of old varieties and be quick to discover the value of new ones. He must read everything published about his favorite fruit or fruits, and be prepared to sift the useful information from that which is not applicable to his local conditions. He must also be a good business man in order to systematize his work, to buy his supplies to the best advantage and market his crops with profit. Many fruit growers have failed on account of weakness in this latter point, being unable to successfully market their fruits after they have grown them.

The fruit grower on a small place has many advantages over the man who attempts to work a large area. There are several reasons for this. Most men are not able to give to more than a limited area the personal attention which is one of the great factors in success with trees and plants. Where large areas are planted much of the work must be delegated to subordinates, who usually are not equal to the owner in their attainments. With a small place under the immediate eye of the owner the various operations of pruning, cultivating, spraying, etc., may be

done well and done on time. In the matter of spraying, for instance, the delay of a week may make all the difference between success and failure in preventing injuries by codling-moth, apple-scab, pear-blight and other fungus diseases and insect pest of fruit trees. In the matter of cultivation, not infrequently a difference of three days, especially if an inopportune rain should come, may result in such a growth of weeds that the tools will not destroy them, and they may make such a start as to make it unprofitable to pull them by hand, while if they are not destroyed the crops will be a failure.

Fruit growing has always been more or less high-class farming. It has been largely undertaken by bright and observing men, who as a rule are more interested in their profession than the ordinary farmer. This does not mean that there are not capable and even brilliant men engaged in plain farming and stock raising; still, as a rule, the men who take up fruit growing as their specialty are above the average in energy and intelligence.

Assuming that a fairly good location, all things considered, is available, one of the most important matters is the selection of suitable kinds or varieties of fruits. Where there are growers in the same section already engaged in the business, one should, by all means, study closely their mistakes and successes and endeavor to select varieties and species that succeed, for no amount of care can ever fully counteract the lack of adaptability to soil and climate so prominent with many varieties of fruits. Mistakes in planting the wrong kinds should be corrected as quickly as discovered. One of the earmarks of intensive methods in horticulture is the prompt pulling out of orchards which are a failure. Careless growers will continue blocks of trees year after year, even though they acknowledge that their planting was a mistake. The small crops obtained annually keep leading them on to spare the trees although no profit is derived. Unprofitable trees should be either top worked to some profitable kind as soon as possible, as with pears and apples and even sometimes with peaches and plums; or else they should be promptly pulled out and something found to take their places.

The thorough preparation of the land is a very important process in planting out orchards and small fruits. Frequently fruit growers are in such a hurry to plant that they are obliged, against their better judgment, to set out trees on ground unfitted by tillage for their reception. Trees to do their best need to have the land in a high state of culture when they are planted. It is wise to anticipate planting by two or three years and practice a rotation of crops which will bring the soil into perfect condition. Deep plowing cannot be done in the orchard, but is by all means to be advised in the years preceding planting. The turning under of green manures and the growing of hoed crops is advisable. On rich land or new land which needs subduing, corn is a very good crop to plant. It will show the poor spots that need extra manure and frequently will develop the wet areas which need drainage.

Tillage is the basis of success in horticulture as well as in general agriculture, good plowing, turning over the land when it is in a satisfactory crumbly condition, not so wet as to become pasty and harden into clods nor so dry that it will not pulverize before the plow. The skillful use of the proper type of harrow is one of the most important operations on the farm. Harrows are now made in such a great variety

of styles and types that it is almost bewildering to the farmer. Nearly every one of these types has its special uses, for which it is superior to all others. The skillful farmer must keep on hand the more important types adapted to his soil, and use good judgment in sending them out to the field. There is a great variation in the amount of culture which is deemed sufficient in the orchards of different sections of the country. However, as a general rule, if the harrowings are done at the right time, as soon as the land comes into condition after each rain, are about all that is necessary for complete success in growing fruit trees, usually, however, to secure maximum results, peach orchards need to be harrowed or cultivated about once a week from blossoming time until mid summer.

The skillful fruit grower watches his trees and plants almost daily, in fact, he treasures up his experience of year after year and knows exactly when he anticipates attacks of many of the worst diseases and insect pests, and regularly prepares for them in advance. Spraying with lime-sulphur is now becoming very common with successful fruit growers. This is the best all round fungicide and arsenate of lead the best insecticide. The details of this spraying cannot be attempted here, but suffice it to say that the fruit grower must have a knowledge of all his suspected enemies and know how to meet them.

No one operation stands out more prominently as the work of intensive horticulture than pruning. To secure maximum results in fruit growing the trees should be pruned skillfully. The young trees must be trained into the form desired, the older trees must be kept in control by pruning. The annual growth of the trees should be headed back to some definite length. However, the general vigor and future possibilities have to be kept in mind. This heading-back process will result in the pushing out of a great many twigs, making the top too thick in future years. This objection is to be met by annually thinning out first the one year twigs, and then later, perhaps with the saw, those of the larger branches, which have not room to develop. A tree so laden with fruit that its branches are drooping to the ground may be an attractive sight, but this is not good horticulture. Partly through pruning and more especially by thinning the fruit, the tree should never be allowed to overload itself so that it breaks down under the weight of the fruit or even permanently bends its main branches very far from their normal position. Thinning is one of the necessary operations of any high-class fruit culture. It has been demonstrated both by careful experimenting and by practical experience to be a profitable process.

Having grown the fruit the next and most important part is the picking and marketing. When fine fruit has been grown up to the picking season the battle has been half won but it has been only half won. The business side of fruit growing then begins. Markets have to be looked up, perhaps in several different parts of the country and the telegraph and the telephone must frequently be used as the fruit attains maturity. The packages, crates, baskets or barrels have to be purchased and made ready for the reception of the fruit. Everything which can be done should be done to lighten the task on the picking days and to distribute the labor. This is especially true in handling perishable fruits, such as peaches, plums, early pears and small fruits. Many sorts of fruits require picking on a certain day. With peaches they may be green one day, matured, fully colored and ready to ship on the next, and possibly

too ripe and soft on the third day to be profitably handled for long distance shipments. All this means that the grower must be ready and waiting for the fruit to mature. A well ordered packing house that has facilities for handling, grading and packing the fruit is a very important adjunct to every fruit farm.

No one thing, perhaps, has more effect on the output of a fruit farm than the manner in which the fruit is graded and packed. It is generally recognized that fruit must be handled with great care if it is to be kept sound, but few have realized, until it has been demonstrated to them, how easy it is to injure fruit in handling and how much injury is actually being done. It has been shown that the moulds generally gain entrance through mechanical bruises of the skin made in the handling of fruit in preparing it for market. Some common forms of such injuries are the bruises and scratches made in the picking of the fruit, in squeezing it and dropping it roughly into picking boxes, bags, baskets, or in pouring it from the field bag or baskets into boxes. Hauling on springless wagons may seriously bruise the fruit. Dirt, dried branches or twigs in the bottom of the field boxes are also a frequent source of injury. Injuries of these types are not only difficult to detect but offer ideal conditions for the starting of decay. It has been remarked that it requires an artist to select fancy exhibition fruit for the fairs, but this may be extended. It requires an artist to grade and pack fancy fruit. There are few people who really can do it or, at least, few who do it. Of course, all the fruit cannot be grown fancy, and two, or sometimes three or more grades are frequently shipped—all good marketable fruit. Nearby points can sometimes be utilized in shipping of that which is too ripe to carry long distances. Culls, bruised specimens, and wormy fruit should always be kept out of the standard grade, but they can often be utilized for canning, evaporating, making into cider, etc. At any rate, nearly all the fruit has a place somewhere and it is the duty of the marketer to sort his fruit and put every grade in its place.

We must not stop with the better methods of growing, packing and marketing our fruits; but we want to educate the people to eat more fruit, thus creating a greater demand. By reason of a suggestion I would submit as "slogan" for the fruit growers "Eat an apple every day—keeps the doctor away" or Health's best way—eat fruits every day."

If you use these slogans at the fairs, conventions, etc., the public press are bound to use it in reporting it as news matter. It would also become known if used in our daily papers when advertising. Or, if need be, place a neatly printed card of an apple, peach, etc., and the slogan printed on it in each barrel or box. The idea involves the thought that the slogan will create a larger consumption of fruits and a liberal supply of health, all of which should help in advertising our fruits and creating a world of friends and advocates of the use of fruits.

COOPERATION IN MARKETING FRUIT.

SECRETARY CHAS. E. BASSETT, FENNVILLE.

The need of cooperation depends upon three conditions in the state that must be remedied. One is poor fruit, another poor packing, and third, the lack of any systematic distribution. These are the conditions which face the Michigan fruit grower.

Unless we can improve our growing system by producing better fruit than we have been doing, we will always be up against it. But with the fruit we have, our packing conditions are not what they should be. Our fruit must be packed better than it is packed; more care taken. Then, even with good fruit and rightly packed, unless we can improve the distribution of our fruit, the future looks bad for the Michigan fruit growers. But as one who has faith in the ability of the Michigan fruit growers to improve these conditions and remove these obstacles, I will offer a few suggestions.

I think that in practically all of the letters that have come into the office of the secretary, with suggestions as to what must be done to improve our conditions, almost every person suggests that we should change from the barrel to the box. I thought so when I first began to weigh the situation, but just let me drop this thought here, the trouble with the Michigan fruit, and Michigan sales of fruit, does not depend upon the package primarily. It is not what we use to put the fruit into, but it is the fruit itself that is packed into the package that is important. The western people were forced by their distance from market to market nothing but the very best, and they used the box, and because the fruit in the box was all right, a good name has been created for the *box*, but do not think for a minute, my friends, that the box would have won favor if the fruit had not been packed in it that the public demanded, and for which they were willing to pay a good price. In other words, it was not the package, but what was in the package, that won the good name. I have seen this thing in our own vicinity when marketing in fancy packages. I remember one—a 20-lb. bail package, was a good package for fancy fruit, and in a way we adopted it, but in a short time some fellow—and I will not say that I was not that one, put fruit in those packages that was not first class, was not strictly fancy, and today that package is no better than any other package. So I say you will never create a demand for Michigan apples by adopting a certain package unless that package contains good fruit.

Nevertheless, this matter of packing must receive our serious consideration, and after the fruit is packed properly, then it must be distributed to the consumer, so that every man, woman and child who wants it can get it in sufficient quantities to supply the demand, and in such shape and condition that when he has had one package, he will go back for another. These are problems that must be worked out, and never until they are satisfactorily solved will we succeed in apple growing in Michigan as we should, and I want to tell you that they will never be solved by merely theorizing.

I would like to have you pay a visit to our own locality, which as you know, produces more cold storage apples than any other two points in Michigan. I would like to give you a little of the history of how the good growers around there propose to meet the situation and solve it by co-operation. I have talked co-operation for the last fifteen years, and almost feel that I am a crank on the subject.

We had an enormous crop of apples last fall and the apple buyers saw the situation and started in to "bear" the market, and we didn't have sense enough to "bull" the market. These buyers went to Detroit to the apple buyers convention and when they returned from the meeting there, they said, "We can not buy any apples." Our people got excited, and finally the buyers talked that the best that could be offered was \$1.50 a barrel. Well, we got together at our Grange and talked the matter over, but there was not a thing done. But when these buyers saw that there had been a meeting called to talk the matter over, and we showed by our coming together that we meant business, apples went up 50 cents the next day.

So I say, we must organize and have a co-operative organization. In this particular instance, we were too late in the season to effect anything much, but we did put our fruit in the Chicago cold storage, and we got a fair price for it, much better than if we had sold before, and much better than if we had not had that meeting.

We boast of our markets close at home, but did it ever occur to you that this very thing may work to our disadvantage? I think it does. I think that is the reason why Michigan fruit has a bad name, because we have been taking advantage of our advantages, and making them our disadvantages. The western fruit grower does not have our favorable conditions. He is not more honest than our Michigan fruit grower, but his conditions compel him to work along a business plan. When a Michigan man goes out to Oregon and pays \$2,000 an acre for land, does that change his nature—make him more honest? No sir, that is not it, but the fact that we are near markets makes it possible for us to put upon the market that which never ought to go there? And when a man finds that he can not raise and sell poor fruit, he will find a method of raising and placing on the market better fruit. It takes a man with ambition to raise something better than poor fruit.

Personally, I do not believe that Michigan will ever secure a wonderful name for its fruit as long as the grower packs his own fruit. Of course we have such men as Morrell, and Wilde and Rose with a state and national reputation, but the majority of the fruit growers of Michigan are not in that class, and I am still to be classed among the majority. And I am free to say that I honestly believe that the average grower is not fit to pack his own fruit. The minute he does it he has trouble—an eye trouble, I forget the name of it as given by the oculist, but it is where the eye increases in its magnifying power and non-ability to see the defects in fruit. The disease seems to be incurable except by a system of co-operation, something like the western plan of co-operation. There must be first a superintendency which will eliminate the greed and selfishness of the grower. In our locality we have some good orchards, some not so good, and some that are poor. It is intended to bring together these growers into an organization, having a cast-iron agreement, by which a man will be employed by the year as superintendent at a

good salary. Most usually foremen are employed who will go into the fruit orchards of the growers, and these growers will have nothing whatever to say as to what shall or what shall not be packed. The fruit will be graded, and the good stuff will go into boxes or barrels, and labeled with the owner's name, and that fruit will bring the price as has been shown by the returns that have come to those who do so pack their fruit. What can that superintendent do? In the first place, he can not only look after the packing of the fruit, but he can be a reliable source of information for that locality as to market conditions, and then not wait until the market is ready for the fruit, but find a market for that fruit. For instance, after all the apples had been shipped from Fennville I had inquiries, and could have shipped four car loads to Iowa points after the fruit was moved. If a person had been a superintendent in that locality he could have worked up these markets. This year he could have found that there was not enough good fruit in Iowa, and could have located and could have sent car loads of guaranteed apples at the market price, and the result would have been that a market would easily be had for the fruit. This superintendent can also look after the matter of supplying the packages. Then, another thing, buying the spraying materials in some localities; buying spraying machinery, saving 30 per cent on most power sprayers. He can be general agent of these localities. In addition to this, he could employ competent foremen who have no interest in the fruit of which they are to boss the packing.

The man having apples to pack under the direction of a foreman, that foreman will boss the job of packing, he will see that the fruit is gathered properly, packed as it should be according to grade, and the result will be that it will go on the market in the best possible condition; then in addition to that he will see to it that a copyright label is adopted, for this should be done if it is desired to create a name, and whatever this label or name is to be, it must be one that will attract attention. Mr. Morrill took a "Hoodoo" melon, gave it a name that was attractive, and sold it all right. So you see there is something in a name. "Hearts of Gold" placed on a handsome label pasted on the packages containing these melons sold them in the market where before they were a drug on the market. In Chicago they brought double the price that they did before.

The plan in Fennville is to have one shipping point in four townships. All of this fruit will be packed under one general superintendent. The matter of marketing can be largely done by this superintendent.

In addition to this question of box or barrel packing of fruit, there comes also to the office of the secretary this question, "Are you not afraid we will raise too much fruit?" You know the answer to that. Why is it that people are buying bananas and oranges and lemons and even persimmons—the grocer knows that if he buys a box of lemons or a box of vegetables from an organized section, there will be so many in a box; he knows that, barring accidents, these will be all right; he knows that the fruit in the bottom of the package is just the same as on top, and he can sell from the top of the box knowing that the bottom will be just as good. But he knows that if he buys a barrel of our apples, it is liable to be something different. A man who buys a suspicious looking package, recognizes it as a sort of lottery and pays

accordingly. And buying apples in barrels under no name is about the worst lottery that a man can ever run up against. The consumers do not buy our apples because the fruit is not what it should be, and it takes so long for them to get the bad taste out of their mouths after trying a package. With the ordinary apple grower, I do not believe it is possible for him to pack his own fruit and get it right, and therefore it must be done by this cooperative method, if the most satisfactory results are to be secured.

Across the road is the display of fruit from Mason county. It is a magnificent display. But how many barrels did you have to look over to get that quality of fruit? Or is that the kind you raise here, or produce all the time? What percent of your fruit went over there into that building, and what percent went to the cider mill? We can raise better fruit if we have to, but so long as we think that "anything will go" there will be little or no change. What we want is men who will say, "Nothing but the best will go," and then there will be a coming up in fruit raising that will mean something, and there will be no need of any apprehension as to getting too many orchards or too many fruit growers—there will always be a demand for all the fruit of that kind that can be raised. So let us get back to the thing we started with—don't trust to any one package; don't think you are going to ship out trash in attractive looking boxes and be able to sell it for any more than barrel apples.

LEGISLATION FOR THE MARKETING OF FRUIT.

R. A. SMYTHE, BENTON HARBOR.

The legal side of raising and marketing fruit has been sadly neglected: this might be properly called the *moral side* of the business, and as our morals are often influenced by what the law allows, the two are closely united.

A man is usually considered honest until he is proven guilty; but observation along the line of fruit marketing leads one to the conclusion that it is unnecessary to wait for further proof before pronouncing too many shippers guilty of gross carelessness and dishonesty.

How are fruit growers to be made honest? Either from the fear of God or the law; and the latter, I am inclined to consider the greatest human enforcing agency in existence.

I am sorry that we must resort to legislation to accomplish what pride and honor should do for us; but if legislation will help to improve our present conditions, then let us have it.

At the outset almost every grower raises some very good fruit for which he hopes to obtain a tip top market price; but does he? Not always; many times the desire to unload a quantity of fruit of uneven quality tempts the grower to spoil his No. 1 article by mixing it with lower grade fruit, thus lowering the price on all his product; he would do better to grade the fruit carefully, and not try to pass off for his

best anything that is not No. 1; in this way he would get just returns for the different grades of fruit as such—and would not be the menace that he is to the market for others; the dishonorable packing of one grower can neutralize the influence of ten honest ones.

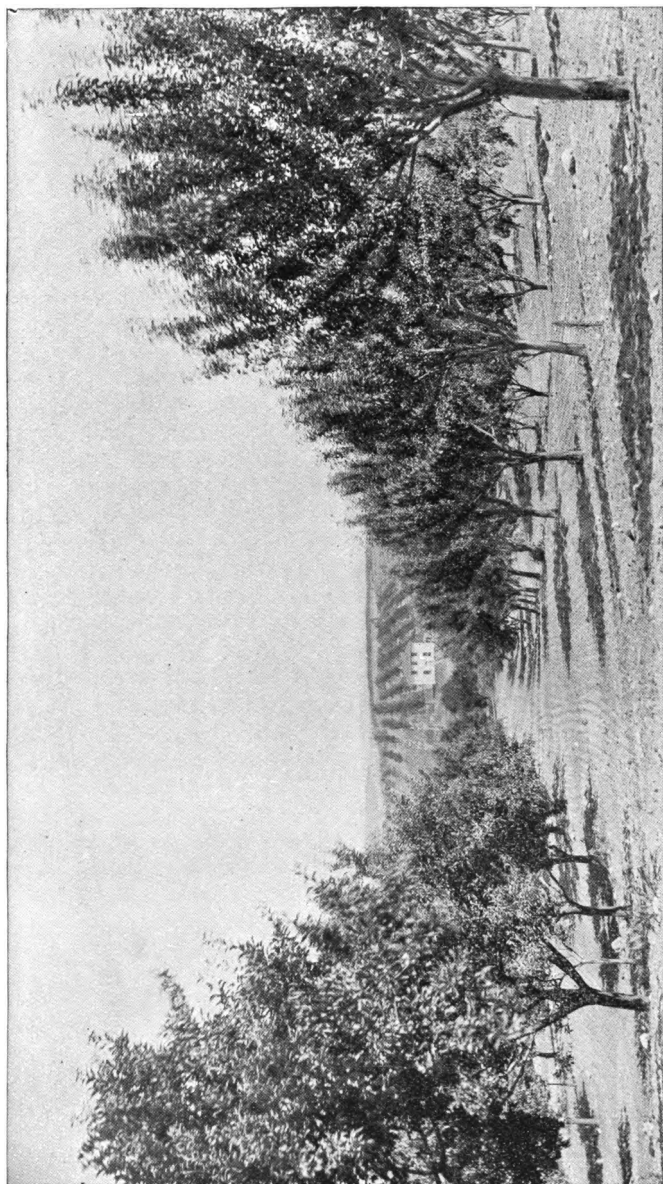
The buying and consuming public when once “taken in” on a purchase, become sceptical and resort to bartering and beating down the price, fearing that in any event they will be beaten in the quality—no matter what price is paid.

Let me tell you of some observations along this line:

In the early part of last August I was in Chicago, and wishing to know something of the fruit situation, I went over onto South Water Street; in passing one of the numerous commission houses, my eyes were attracted by an open bushel basket of Elberta peaches that stood in the doorway; as there were still three weeks before Michigan peaches were ripe, I stopped to examine the fruit and found the “early” Elbertas rotten with the yellows; I asked the price, and on being told that they were \$1.25 per bushel, I remonstrated with the salesman, “Those peaches have the yellows”—and asked him where they came from; his reply, in a most disgusted tone of voice was “Michigan”—I lamented the fact that anyone would send such fruit to the market; when the salesman discovered what state I was from, he proceeded to dress down the Michigan fruit growers from one end of the state to the other, declaring that there were no honest men on this side of the lake; of course, I took issue with him, but as our commission friend was so badly upset (just about at this season Duchess apples were such a drug on the market) that he was unreasonable, I waited for him to exhaust his bad feelings before I told him that we had tried to have passed, at the last session of the legislature, a law requiring every shipper to put his name on his packages. He went up in the air again about this, and when I asked his objection, he said repeatedly, “we don’t want your name on the package,” and when I insisted upon the reason for this, he said again, “we don’t want your name on your package—we don’t want to advertise *your fruit*,” to which I replied “I thought as much.” We must work out our own salvation independent of the commission merchants.

Another observation: A buyer told me that he bought a car of Bartlett pears and consigned them to Milwaukee; the commission house there reported that so far as the pears had been examined, only 10 barrels had been found that did not have apples packed in the middle. Would such be the case, do you think, if barrels were labeled with the name of the shipper?

During our pear-packing season this fall, a man worked for me who had previously helped a neighbor north of my farm. When he saw that we culled out the small and indifferent ones, he remonstrated with me, “Mr. So and So put in all such; he faced up the barrel very nicely, put in a basket of good fruit, and then filled up with the rest.” Now Mr. So and So is a large grower of pears, and being able to furnish the buyers with large orders for filling their cars, his pears were in demand, and I discovered that his fruit brought a better price than my own smaller shipments; but I also learned that the party at the other end of the line said he would gladly spend the price of the car load to locate the man that had packed the fruit that way. If Mr. So and So’s name had been on the barrel, he would have been held responsible for



Western Michigan is Being Reforested with Fruit Trees. Buckley & Douglas Lumber Co., Manistee County.
Courtesy of the West Michigan Development Bureau.

selling goods under false pretenses, but *had* it been there—do you suppose for a moment he would pack such stuff for first class fruit? Hardly.

What of the man that puts up fruit in a “snide” package? He may be the gainer for a short time, but sooner or later his plan is discovered—and then—what? He gets less for his package, (according to its size) and his empty package costs him just as much as he would pay for a standard package; his expense of picking, freight, and cartage, are just the same as for the standard article, so in the end he is a loser. But this style of business is being done all over Michigan today. I could cite many instances of the losses we suffer every year through the use of packages being reduced in capacity, but does the Package Manufacturer care? Of course he is not interested, he charges just as much for a six pound as for an eight pound grape basket—you pay your money and take your choice. For a time you may even be able to sell your six pound basket for as much as I get for my eight pound basket—but that can only be for a short time—and then your price will be cut, and you will complain of the poor market.

I would hail with delight the day that would see all fruits and vegetables sell just as grain, meat and dairy products—that is, *by weight*; it is the only fair proposition to both grower and consumer.

There should be a federal law establishing a standard of measure for the United States, so that a barrel, bushel, peck, or quart would be the same in New York as in California; I once heard a speaker in Wisconsin declare that he found seven different sizes of berry boxes in his home market, and they were selling for practically the same price, excepting in the case of a fancy article.

In my opinion, it is time for us to wake up and see if legislation can not help us to solve the problems that confront us. In Idaho, if a man packs any fruit with “scale” on it for sale, his fruit is confiscated, and some of the states have laws compelling the inspection of fruit the same as of dairy products.

Canada has a law known as the Mark’s Law that is a fine thing, and I should like to see the same law enforced in the United States.

I hope the state society will take some action on this matter at this time, as all must realize that no question is more vital to us today, than the honest packing and successful marketing of our fruits.

DISCUSSION.

A Member—What was the legislation that was attempted at the last sitting of the legislature?

Mr. Smythe—The law in brief contemplated compelling every grower to put his name on his package, designating the size of the type to be used to be one-half inch long, where the fruit was packed, by whom packed, etc. Also that 85 per cent of the fruit should come up to the quality designated. This bill passed both the House of Representatives and the Senate, but when it came to the Governor he cut its head off. Before doing so he telephoned me asking me what I had to say for it, as he knew it came from me through our representative. I asked him what he wanted me to say? and then he said he did not think he could sign it. I asked him his objection, and he replied, “The canning factory men are

here and they say that if it is passed it will put them out of business." I asked him why, and he replied that it would do that, and asked that I come over. This was in May, and as I was very busy, I did not feel that I could go, and said to him that I judged that he had already made up his mind on the matter, and I did not know that my going over to Lansing would help matters any. He replied that he thought that he would veto the bill. For the life of me I can not understand why he took that attitude, or what there was about the bill that would put the canning men out of business, for there was not one thing in it that even in the remotest way referred to them or canned goods of any description. The bill read, "All fresh fruits and vegetables" packed in boxes or in packages covered with slats or any cover so that the surface could be exposed to view, and the barrel package was considered as a closed package.

A Member—Do we understand that our Governor upholds men in putting out apples with a half bushel the best in the pile and the rest of the barrel not fit for cider apples, and then marking it as No. 1?

Mr. Smythe—I do not think Governor Osborn does that, but I do not think he got at the spirit of the law. The fact is, the fruit from Michigan is regarded as dishonestly packed, but it is my opinion that many of the buyers are not packing any more honestly than the farmers. I know of orchards where the buyers have come in and packed the fruit and the work was done by boys and incompetent help so that the results were anything but satisfactory. I have had some actual experience in this direction and know what I am talking about.

Mr. Bassett—What are we going to do about it? When Gov. Osborn answered that there was opposition to the bill, we should have been prepared to raise our voices good and loud. I do not care whether he is Republican or Democrat—this is not a political question—this is a bill that vitally interests us, and we want to show our colors and let it be known that we are supporting the bill. (Applause.) When this matter comes up again at the next legislature, as it will, we want to say that we demand a law for our own protection. We are demanding a law for the correction of our own faults. The consumers are not asking for this law. Here is a body of growers who show their honesty and interest by asking for a law to make themselves honest. There is not a man big enough to carry it through if all the rest oppose it. This law is asked only for the betterment of Michigan.

Mr. Smythe—As I said before, I can not for the life of me see why the Governor vetoed this bill. It must have been looked over by those who had it in charge and when it came before them, it was voted on favorably. And the bill was vetoed after the legislature had adjourned. I think it is time for the farmers to wake up. The state of Wisconsin has more farmers in the legislature than any other class, and there is more being done to better the condition of the farmer than almost any other state in the Union; so much so that Wisconsin is counted as one of the leading states of the Union in almost every line of work. What the matter with us is that we are sending a lot of shyster lawyers up there who don't care a rap for the interest of the farmers, and as long as we farmers let this thing go on without a protest, it will go on. I should like to see some legislative talk in all our winter meetings. You

all have good ideas, and it is time that we spoke right out in meeting and have it mean something.

A Member—This is not a political organization. Once Henry Ward Beecher expressed the attitude that it seems to me we could adopt. Just about election time he met a young minister to whom he said something about political matters, when the young man excused his lack of interest by saying that his citizenship was in heaven. Beecher responded, "Then I think you had better get it down to earth until after election."

A Member—What we want are men in the legislature that are interested in our business—men who are themselves farmers and fruit growers—and this is the kind of people we want to have represent us.

A Member—I would like to know definitely how many farmers there were in the last legislature? If I am not mistaken I think there were forty-four farmers, plenty enough to carry the bill. I think the thing to do is to train some of the farmers we already have.

Mr. Bassett—I think the proper thing to do is to train the governor—he is the one who needs training.

Mr. Cook—I have had a little experience in the legislative work, and I have been surprised to find that only about one-half of these farmers have the ability to discriminate as they should. A good lawyer from a shrewd corporation is more than a match for these farmers. It is up to us to put good clear-headed men up for these places of trust. The man who is in the thing for a fee is not fit for our legislative hall, nor is the man who has too many irons in the fire. But these things can not all come in a minute—they must come slow. Not one farmer in ten is making any study of agriculture as a profession. It is such an agitation as this that will build up sentiment, and help us along in lines that we are wanting help for the betterment of our condition.

A Member—The trouble is not alone with the legislature—it is up to the Governor—it seems to be in his hands. I think it would be well to put something in our resolutions touching this matter, and then let him know of our action. The people who keep quiet will never get anything.

IS LIME-SULPHUR A SATISFACTORY SUBSTITUTE FOR BORDEAUX IN THE SUMMER SPRAYING OF APPLES.

PRESIDENT T. A. FARRAND, EATON RAPIDS.

For the last ten years I have danced to the fiddling of every President, Mr. Cook included, and your secretary, and the members of this association, at all times and in all places, and you don't know how much fun I have had out of the thought that the time had come when I could sit on the fence and see these fellows dance to my fiddling. But all my dreams have been only dreams, and I find I am in the grind just the same now as ever.

I will endeavor to give you briefly my experience along the line of the topic assigned me.

Lime-sulphur has been a very good substitute for the old Bordeaux

mixture. Bordeaux is a splendid fungicide, but it was very apt to cause a russetting of the fruit, and some years this was very injurious especially when it came to disposing of the fruit in the fall.

And now, while I do not know what future years may bring forth, we do know that while in some years there has been a great deal of russetting from the Bordeaux, in other years the fruit has been fine, showing quite conclusively that the season had much to do with the spraying results.

I know of no year that Michigan has produced as fine a quality of fruit as has been harvested in all the apple producing sections of the state, the finest color and the smoothest skin. I am not prepared to say how much lime-sulphur has had to do with this, for I do not know. It might have been just as good if we had used Bordeaux. It has been a season where even the non-sprayed orchards have given a yield of fairly good fruit, showing that the season was usually favorable to producing apples without the scab. In other words, it was unfavorable for producing the scab.

Lime-sulphur is a good substitute—that is, we are apparently all satisfied with it, so far as results have been attained, especially in the past year, but it is possible that in future years, in seasons not so favorable, it will not give such apparently good results. We have used it 1-35-40 for summer spraying, and we had no russetting of the fruit, although the foliage was burned a little, I do not know just what was the cause of the burning.

A Voice—You probably made it too strong.

I am inclined to think that 1-35 would not do it, but the combination of lime-sulphur with arsenate of lead is more apt to give the burnt condition with the old Bordeaux mixture, because when put in with the lime-sulphur there is a breaking down of the arsenate of lead from contact with the lime-sulphur—I can not quite explain it, but I am satisfied that we burn more when put on together than when put on separately. At the same time we are very glad to know that even though we got the burning effect on the leaves we did not get it on the fruit. Even right where the foliage was burned, we got fruit of exceptionally fine quality. The Baldwins would take a polish like a Jonathan. I never saw such a fine skin on Baldwins as we had this year. We did not have any scab.

With these things in view, we would be foolish to go back to blue vitriol, unless in future years we found by actual experience that the lime-sulphur did not prove satisfactory as it has the past year. At present I would not spend a cent for blue vitriol for spraying apples. I may change my mind next year, but I shall continue to use lime-sulphur, which I did exclusively this last year, until I find something better,—I mean for summer spray. I do not believe that Michigan apple growers will ever have to go back to blue vitriol.

I may say, however, that I am not as well satisfied with lime-sulphur and arsenate of lead as I would like to be, but I do not know of another poison that is any more satisfactory, and so until it is found I shall continue to use that combination.

I have sometimes thought that we might get more satisfactory results if we used the arsenate as a clear solution after the blossoms are out, than to use the combination. In the west where they have gotten great

results with only one spraying, they used the arsenate of lead without any fungicide with it.

As I said before, there may come years when because of the atmospheric or some other conditions, the lime-sulphur will not give as satisfactory results as we would desire, but unless there is a change of a material nature, or until something is found that is better, I think it will be safe for us to go on using lime-sulphur as a summer spray as a substitute for Bordeaux mixture.

DISCUSSION.

A Member—Did you notice any fungus leaf-spot on cherries?

Mr. Farrand—I cannot say for certain, although I think they must have been about normal or I would have noticed it. I remember as we were putting in our cover crop that I noticed a pretty good foliage. If there had been any defoliation of those trees I would have noticed it.

A Member (further)—Some cherry trees would have the cherries hanging on with only a few leaves on the trees; on other trees the foliage was very good after spraying. I noticed these two conditions.

Mr. Rose—Regarding the burning of certain varieties, would say that we tested it thoroughly at our place, and found that the Wagoner, the Grimes Golden and the 20-ounce Pippin were very susceptible to the burning when Bordeaux mixture was used. Personally, I would not recommend Bordeaux for spraying apples at all. There are some varieties, like the Spy, for instance, that have a tough skin and will stand it pretty well, but the great majority will not. The lime-sulphur solution did not affect them this way.

A Member—Can we take care of cherries, without Bordeaux, using lime-sulphur?

A Member—I had some experience with plums—sprayed with 1-35 and secured a good crop. On some others I tried 1-40 and I had rot.

Mr. White—During this past year we performed some experiments with commercial Bordeaux and self-boiled lime sulphur. On the plums the commercial lime sulphur controlled the rot absolutely. On the unsprayed trees the rot was so bad that the crop was not worth harvesting. There was some rot where the Bordeaux was used. On sweet cherries we tried the self-boiled lime-sulphur, 8-50, commercial lime-sulphur, 1-40, on Windsors and one or two other varieties, the result was that with commercial lime sulphur spraying there was a heavy foliage, but when we had that hot weather in July, 3-5, the sun did not bake the cherries as in the others. On the unsprayed trees, and those on which were used the self-boiled lime sulphur, the crop was so badly withered up by the hot sun because of the lack of foliage, that the crop was all lost.

Mr. Rose—How did it come that you did not have any foliage?

Mr. White—It came from shot hole fungus. We used commercial lime sulphur and also Bordeaux, equally one with the other. Apparently from our experiments which we conducted in an orchard a mile and a half from where the United States Government were at work, we did our work just at the right time, for on account of having to wait for directions from Washington they delayed for a week or ten days later than

we did, and the result was they lost their foliage very badly. This was all due to the few days' delay.

Prof. Green—We have come to the conclusion that the lime-sulphur is not so strong a fungicide as Bordeaux, and does not control grape rot and bitter rot so well. Lime-sulphur is strong enough for most purposes. On the other hand, Bordeaux sometimes does a lot of damage to the apple and the foliage. What we call the "Yellow Leafing" or yellowing of the leaf in June, turning yellow and falling off in some varieties, especially the Rome Beauty. Bordeaux makes it worse. Some of our experiments that we laid out where lime-sulphur and Bordeaux had been used the year before, we found that the results of that year had been such that the value of our experiment was destroyed. That is, the Bordeaux did so much harm that the leaves all fell off and there were no fruit buds this year. This has occurred with us several times in the past, and so we have come to regard Bordeaux as rather risky to use because of this result, as well as from the russetting of the fruit.

Mr. Farrand—For the past ten years, with all the work I have put in along this line, I have been conservative. I would be the last one to let the bars down by throwing away something that shows good results without first giving it a thorough trial. Twenty years ago we did not have the injury from the Bordeaux that we have now—I can not explain why—it has been the greatest spray for apples we have ever had in Michigan, and yet during the past two to four years there has been a good deal of injury resulted from the use of Bordeaux. And yet I am free to say that I would rather have that injury than take the chance of not using any spray. But with the experience I have had I would not spend a cent for blue vitriol as an apple spray, and if anyone would ask me for my opinion I would advise that they use lime-sulphur instead of Bordeaux and honestly too. What the future will bring forth I do not know. I may change my mind—that will depend on new facts that may possibly be brought to light on this subject.

A Member—Do you not think that 1-50 spray for the summer would be strong enough?

Mr. Farrand—I do not know—I use 1-35.

A Member—We use 1-50 on all orchards in our locality, and it seems to be strong enough.

Mr. Farrand—I am glad to know this, but as for myself I do not want to take any chances with the scab.

A Member—How late do you consider it safe to spray, providing you could not get your spraying done earlier—at the opening of the leaf or buds?

Mr. Farrand—We had an orchard that we sprayed with a solution 1-8 when the foliage was out, little leaves had started, and the buds were swelling and some of the blossoms had opened, and we think it was the wisest thing we could have done. We had some little injury to the foliage, but it was a wise thing to do.

Prof. Green—We had a case of that kind, and it killed nine-tenths of the blossoms. I had done it in previous years without serious injury. but I do not think it is very safe to spray as late as that.

A Member—I would like to have answers to question No. 34, which is, "Does Lime Sulphur deteriorate by freezing?"

Mr. Farrand—That depends entirely on whether the solution is a perfect one or whether there is any sediment in it. If so, crystallization will take place. It should be air-tight, and even then if there is foreign matter there will be some crystallization. The freezing will not hurt it if it is left perfectly quiet until it has thawed out. This may burst the barrel, and you may lose some of the liquid, but the strength of the material will not be lost simply by freezing.

A Member—Is there anything to be gained by using an excess of lime in our sprays?

Answer—I have a neighbor that puts in an excess of lime, the object being that he may the better see where he has been. I do not think there is any advantage in it so far as the solution is concerned.

A Member—I would like to know if arsenate of lead is affected by freezing?

Answer—With the exception that it does not mix up as readily, there is no trouble—the poisonous property is not destroyed. Freezing will make it granulate, and it is rather hard to dissolve these hard granules.

A Member—That is my experience—it took a long time to pulverize up these granulated particles of the arsenate of lead.

COMMERCIAL FERTILIZERS.

PROF. A. J. PATTEN, MICHIGAN AGRICULTURAL COLLEGE.

It is safe to say that more money has been spent unwisely or blindly upon commercial fertilizers than upon any other commodity with which the farmer has to do.

If I were to ask each person who uses commercial fertilizers, in this audience, his reason for choosing any certain brand in preference to the others at his command, I wonder how many could give a real sound explanation based upon his observation of the soil and crop.

Now the reason for this is, to my mind, due to our ignorance of the effects of fertilizers upon the soil. For years, in fact ever since the famous German chemist, Liebig, pronounced his theory of fertilization, commercial fertilizers have been looked upon simply as a means of supplying plant food to the soil to compensate for that removed by crops. Many of you will remember what a volume of criticism was heaped upon the Bureau of Soils of the U. S. Department of Agriculture, about ten years ago, when they first intimated that fertilizers may have other functions in the soil.

Today, however, scientific men the country over are more and more inclining to this belief.

In support of this theory, let me bring the following facts to your attention. The average fertilizer sold in Michigan has approximately the following formula:

1.23% Nitrogen
8.00% available Phosphoric acid
3.00% Potash

Three hundred pounds per acre is probably about the usual rate of application. This means 3.69 lbs. of nitrogen, 24 lbs. of phosphoric acid and 9 lbs. of potash per acre. Now, an acre six inches of soil will weigh from 2,000,000 to 2,500,000 pounds, but for the sake of convenience and to be conservative we will say that the fertilizer has been mixed with 1,000,000 pounds of soil or we might say it has been diluted 1,000,000 times. If we express this amount of added plant food in terms of percentage of soil it would be approximately the following:

.0004% Nitrogen
.0024% Phosphoric acid
.0009% Potash

Any good soil should have 100 times more plant-food than these figures represent. In the face of these figures it almost seems absurd to think that the value of commercial fertilizers depends alone upon the plant-food.

In just what way fertilizers do act upon the soil is not definitely known but we do know that they must have a chemical and physical action upon the soil itself.

I wish it understood that I am not a disbeliever in the use of fertilizers or that I am attempting to discourage their use. On the contrary I thoroughly believe in artificial fertilization but desire to impress upon you that it should be done with more thought and study than has been true in the past.

A great deal of myth and tradition have been connected with the use of commercial fertilizers and many people have conceived the idea that they are a cure for all the sins of omission on their part. But I want to impress upon you that fertilizers cannot take the place of tillage, drainage, rainfall and sunshine, careful preparation of the seed bed and the selection of the seed. These are absolutely necessary functions in successful agriculture.

In order to get the best results you must give the plant the very best surroundings possible. To illustrate this point we may take examples from animal life. Compare if you please the boys and girls living in the unsanitary, foul smelling slum districts in our large cities with the boys and girls living in the small country towns where fresh air and clean surroundings abound. Again, if we desire to fatten a herd of cattle we know that in order to get the best results we must first make their surroundings as comfortable as possible, so it is with the plant, we must first get the soil in the very best physical condition possible, so that the roots may easily penetrate it and the movement of the soil water be unobstructed. When this condition of soil has been brought about, I would strongly advise the use of commercial fertilizers and I firmly believe they will prove beneficial on the majority of soils.

The farms of this country are way below maximum production. We know this to be so because once in a while we receive authentic reports of extremely large yields from soils that had previously only yielded average crops. Only a few weeks ago, I received the report of a corn-growing contest in New England where the winner harvested 160 bushels of shelled corn per acre. Commercial fertilizers were not responsible for this large yield although they contributed to it. It was the labor and care used in putting the soil in the best possible condition that

enabled the plant to utilize the plant-food and perform the functions necessary to growth.

In this connection I wish to refer to an article that appeared in the Detroit Free Press last week, in which Mr. Milton A. McRea, speaking of the need of a commissioner of Agriculture and Horticulture said, "That by scientific soil analysis the chemist is able to tell you just what the soil will produce and in what quantities."

A soil analysis is no more scientific today than it was thirty years ago, in so far as finding out the amounts of nitrogen, phosphoric acid and potash in a soil is concerned. This may be done with a fair degree of accuracy but we cannot tell how much of these elements will become available for crop production. However, even if the chemist could determine the amount of available plant food in a soil it would not enable him to say just what the soil will produce because there are so many other factors upon which crop production is dependent.

The crop producing power of a soil depends upon the climatic conditions, amount and distribution of rainfall and sunshine; it depends upon the physical condition of the soils, its texture, absorptive power and water movements; upon the biological properties of the soil, including bacteria, molds, etc.; upon the chemical composition and character of the soil. It depends upon the drainage, cultivation, selection of seed and variety, rotation of crops and fertilizers. All of these factors enter into the problem of crop production and no one of them can be depended upon to solve it. Just as Professor Green states, some people in Ohio depend entirely upon cultivation of their orchards and believe it is the best method. Others practice the sod mulch methods and believe with equal sincerity that it is superior to all others. Which all goes to prove that no one method or theory of crop production is best under all conditions.

We hear a great deal about worn out soils and particularly about the worn out soils of New England but some of those "worn out" soils in the sense that these words imply, but I do believe that a soil may be misused until it will no longer yield profitable crops. You may continuously crop a soil without putting any humus into it and the yields will grow smaller and smaller, even though you use commercial fertilizers in abundance. The physical condition of the soil has become impaired and consequently the crops cannot make the best use of the plant-food and the yields decrease. On the other hand, if the soil contains a good supply of humus and if all the other factors are properly attended to then, I believe the addition of commercial fertilizers will prove beneficial.

A soil that is in good physical condition is not a mass of dead, inert matter but is teeming with life, bacteria, molds and fungi, constantly at work upon the organic matter of the soil and the results of their activities in turn, bring about changes in the mineral matter of the soil. So we find that the composition of the soil solution from which the plants must obtain their supply of food, is constantly changing and may never be twice alike in every particular.

I thoroughly believe that greater returns will be obtained from money invested in commercial fertilizers when they are used upon a soil that is in good physical condition and when all the physical operations of caring for a crop are carefully attended to, than when used upon a soil

in poor condition. In other words commercial fertilizers will not recompense for lack of proper physical soil conditions. The sooner we learn to recognize these facts the sooner will we reach the point of maximum production. The same thing is true with our live stock. If we want to fatten live stock and do it economically we know that we must have the surroundings the best that it is possible to have, that is, stable conditions as good as possible so that the cattle will be comfortable and in shape to make the best use of the food which we put into their mangers. It is just the same with the plant. We must have the soil in condition so that the roots can grow readily and freely into the soil and can make the best use of the plant feed which is in the soil which is put there artificially. The sooner we learn and recognize this fact the quicker will we be getting up to maximum production.

Now, in regard to the question of commercial fertilizer. There are two ways in which we can buy commercial fertilizer. We can buy the fertilizer which the manufacturer compounds and puts up for us, or we can buy the raw materials and mix them up ourselves to satisfy our own soil conditions and our own fancy. The great trouble with buying the ready-mixed fertilizers is the fact that we do not know what we are getting. We take whatever the manufacturer wants to give us. As to the phosphoric acid in commercial fertilizers I will say that the only sources are bone meal, tankage and raw rock phosphate. However, before these materials are mixed up into fertilizer they have to be acidulated with sulphuric acid in order to render the phosphoric acid available. It will take several years in the case of the raw rock phosphate before it will become available. There are certain conditions under which it may be put into the soil so that it will be brought to a state of availability more quickly but I do not care to discuss that phase of the question at this time. So I say the phosphoric acid that is put in the fertilizers is available phosphoric acid and just as good as can be bought in any other way.

The potash comes from the potash mines of Germany. It is soluble in water and we need give it no further consideration, but when we come to consider the nitrogen then we are up against a different problem. There are many sources to which the manufacturer goes for nitrogen, and they vary greatly in their availability. Because of this fact and because the nitrogen costs from sixteen to twenty cents a pound, is the reason why we should give careful consideration to the buying of commercial fertilizers.

The principal sources of nitrogen for fertilizers are the following:

Nitrate of Soda 15.5%	Garbage Tankage 3.00%
Sulphate of Ammonia 19.0%	Dried Peat 2.50%
Dried Blood 14.0%	Leather 9.00%
Tankage 10.0%	Mora Meal 3.69%
Bone Meal 2.50%	
Fish Offal 7.90%	

The materials in the left hand column are all high grade, that is they have a high nitrogen availability while the materials in the right hand column are all low grade.

When these materials are sold separately they must stand or fall upon their own merits and the low grade materials invariably fall. To

be sure, the availability of the nitrogen in some of the low grade materials, leather for example, is increased by treatment with sulphuric acid, as in the case of the phosphate rock, but as I said before the great objection to buying the ready mixed fertilizer is, that we do not know what materials have been used. The manufacturer may be able to tell, by the appearance of a fertilizer, some of the materials that have been used but the layman has absolutely no way of knowing. The chemist also, has not been able to tell with any degree of certainty, what materials have been used to furnish the nitrogen in a given fertilizer. Neither has he been able to throw much light upon the availability of this nitrogen. Within the past few years, however, a method has been perfected which enables the chemist to tell with a fair degree of accuracy what the availability of the nitrogen in any fertilizer will be when it is applied to the soil. This method has already been adopted by the New England states and also by New York and New Jersey. We are just beginning to try the method out in this state and hope to include it in our fertilizer report within the next year or two.

Many manufacturers and agents will tell you that the fertilizer must be machine mixed; that it is impossible to get a perfect mixture by the use of the shovel. Of course it cannot be denied that the mixing machine will do a better job of mixing than the farmer will do with a shovel. But the process of mixing these materials together does not add one penny's worth to the value of the fertilizer as plant-food. They could just as well be put onto the soil separate and do just as much good as they will after being mixed together by expensive machinery. I believe that absolutely. Of course when these materials are mixed together and put up in convenient sized bags they are more easily and cheaply handled than the separate ingredients would be. The plant-food, however, would not be more available.

If the manufacturers would plainly state upon the package what materials were used in its manufacture then the user would have some basis upon which to judge of its adaptability to this conditions. I do not believe it is asking too much of the manufacturer for a statement of the materials used in compounding their fertilizer. Why not know what you buy in commercial fertilizers as in the other commodities? It is not too much to ask of the manufacturer and certainly it would benefit those manufacturers who are doing a legitimate business.

A Member—What is the filler composed of—anything they want to put in?

Prof. Patten—A great many are using muck as a filler; some use coal ashes—any inert material. Dried peat is a very satisfactory filler and providing, the manufacturer does not figure the amount of nitrogen which peat contains in the total nitrogen guaranteed there is no objection to its use. Peat makes an excellent filler, where filler is needed, because it improves the mechanical condition of the fertilizer. It takes up any excess of moisture and the fertilizer will be dry and consequently drill better. Personally I would prefer not to buy fertilizer containing filler. I would rather buy a fertilizer made up of a high grade material, one that would not require filler, and I would use a little less of it to the acre. You will find that the plant food will figure out cheaper to the pound when you buy high grade fertilizer than when you buy a low

grade. When filler is used you must pay for the mixing, the freight and profit upon something that is not going to do you any good.

Mr. Bassett—Is the intent that we buy ingredients and mix them ourselves?

Prof. Patten—That is what I would do.

Mr. Bassett—That is what you would have us do.

Mr. Patten—If you can get fertilizer manufacturers to tell you what is in the fertilizer and the materials prove to be of high grade and what your soil demands then their use is legitimate and all right. But when some of the manufacturers as we know are mixing in this low grade material, I think a man should not use them and I do not want to recommend them. Our own figures—we have been buying co-operative fertilizer—we have prices on ingredients and I figure that the 2-8-10 combination—to get that in a form of standard fertilizer, the best price is \$28.50 carload lots, or \$29.75 in less than carload lots delivered. You can buy muriate of potash, acid phosphate, and nitrate of soda and in order to make it up two per cent you must have 40 of nitrogen. Nitrate of soda contains 16 per cent nitrogen, strong, so you must use 25 pounds of nitrate of soda, which at \$50.00 figures \$6.25. For eight per cent phosphoric acid, you want 160 pounds phosphoric acid. Then in order to get 160 pounds phosphoric acid you must buy of 15 per cent acid phosphate 937 pounds which at \$14.00 figures \$6.56. For 10 per cent potash you require 200 pounds potash so you would need to use 400 pounds which at \$45 per ton figures \$9.00. This makes a total of \$21.81 or what it would cost to mix this fertilizer at home out of the best materials.

Mr. Bassett—Does it make any difference as to the grade of materials?

Prof. Patten—You must use all high grade materials to get this result. The nitrogen in organic materials cost more than in nitrate of soda, but if you will keep your soil well supplied with nitrogen by cover crops I do not think the fruit grower, the apple grower at any rate, need to spend much money on nitrogen. You can in this way keep your soil well enough supplied with nitrogen for fruit growing—with the exception, perhaps, of small fruits; but I believe in orchards, peach orchards, that you can keep the soil well enough supplied with nitrogen by using leguminous cover crops.

This morning while I was lying in bed Prof. Eustace handed me a book which Mr. Smith gave him yesterday to read, the title of which is "How to Grow a Hundred Bushels of Corn to the Acre." This book takes up the very point I have been trying to tell you about and elaborates on it more fully. I believe that is one of the best little books I have seen in a long while. It emphasizes these very points; the necessity of turning under green manure, the necessity of thorough, constant tillage, drainage and all these factors. The editor is William C. Smith of Delphi, Ind., and it is published by the Smith Publishing Company of Delphi.

A Member—How do you consider a practical way of putting on nitrate of soda—if it is in lumps?

Prof. Patten—The only thing you can do then is to break it up.

A Member—Will it not loosen up in the sack when you roll it about?

Prof. Patten—Usually it will pulverize up in pretty good condition.

A Member—Would it not be better to buy dry blood than nitrate of soda? If a rain comes right afterward, where will it go?

Prof. Patten—I don't believe in putting fertilizers on a very porous, loose soil without you use cover crops to get humus into the soil, and if you put on dry blood perhaps it would not wash out so readily as nitrate of soda. But I wish to emphasize the necessity of getting humus into the soil before you do this.

A Member—We have had an experience here and found out by putting on a 2-8-10 fertilizer we were able to get a good catch of clover which we could not do before.

Prof. Patten—Perhaps your soil condition was such that this was made possible.

A Member—Is there any difference in what form you buy phosphoric acid—say ground bone or rock for orchard use?

Prof. Patten—Do you mean the raw rock and untreated bone?

A Member—I mean as fertilizer is usually treated.

Prof. Patten—There is not a bit of difference in the phosphoric acid of bone and raw rock after they have been treated with acid. The untreated bone or raw bone is considered to be more available than the raw rock.

A Member—How shall we know when our apple orchard needs potash and phosphoric acid? And if our orchards are bearing good crops, about how much would you put on per acre?

Prof. Patten—I don't know whether I can give you a very decisive answer because the experience has been so varied—it depends upon the locality, the soil you have, etc. So far as I know, there is no way that you can tell when an apple orchard is in need of phosphoric acid or potash; that is from the appearance of the fruit or leaves. You can tell as far as nitrogen is concerned by the appearance of the foliage. When the foliage is looking yellowish or yellowish-green it is in need of nitrogen, but as I said before I do not know of any way to tell from the appearance of the foliage or the appearance of the fruit whether it is in need of potash or phosphoric acid. Some think that potash will color up the fruit, but I do not believe that has been proven. Prof. Green may be able to give information on that point.

Prof. Green—I am not able to give any information on that point. In our work we have no evidence that potash colors the fruit.

A Member—What does potash do?

Prof. Patten—Well, one of the functions of potash is to stiffen up the woody part of the plant, when, for instance, your wheat or oats make a big growth of stalk, it is an indication that there is lots of nitrogen in the soil. Under these conditions, if the grain lodges and does not come up again it is a good sign that the soil is deficient in available potash, and its application would have stiffened up the stalks and prevented lodging. Another thing, it aids in the formation of the starch and the transfer of the starch in one form to another.

A Member—If your fruit was green and inclined to be soft and spongy, would that indicate that potash might be used to overcome this difficulty? And on the other hand, if it is firm and red, would that indicate that it has a sufficient amount of potash, on your theory of the action that it hardens up the texture?

Prof. Patten—I would not make any definite statement on that point.

I don't know of any experiments that have been tried to determine it. It is only a theory at best but I would not be at all surprised if it were true. I think it is true that if you have plenty of potash in celery soil, you will get a crisper article than where you do not have it in very large amount.

A Member—I once tried this experiment on peach trees, putting it on alternate rows, using eight or ten pounds of potash to each tree—muriate of potash—putting this around the trees, then I skipped two rows. But from all that I could see it made no difference in the coloring. But the use of some kind of fertilizers for different crops, I have seen what appeared to be a marked improvement in the crop of a tree and the appearance of the fruit. I have experimented with ground sheep manure and it has been satisfactory.

Prof. Patten—I don't believe that any fertilizer will make any difference with the color of the fruit. Sunshine is what colors fruit and if you don't have the sunshine, you won't get color. I think it is true that the yellow is a soil trouble as you know, and by proper fertilization I am of the opinion that it can be overcome.

A Member—Do you really think that this is so?

Prof. Patten—Yes, that is my belief. And I am also of the opinion that apple trees such as take several years to come to maturity, we can get quicker returns when fertilizers are used than when they are not. We can not expect to see the results on these slower maturing plants the same way as on a crop that will come to maturity in one season.

Prof. Green—I recall taking a Baldwin tree and making an application of commercial fertilizer, and that tree bore six barrels of apples and the next year the same. One of my neighbors did the same thing. Now it seems to me that this is a good thing. Ordinarily our orchards will bear a good crop this year but the next year it will be poor one, so if we can demonstrate that we can feed our trees so that they will bear alike every year, we have done a good thing.

PEARS FOR PROFIT.

GEO. E. CHATFIELD, SOUTH HAVEN.

Pears for profit or pears not at all. This statement in general will apply to all kinds of fruit growing as well as to all classes of industry. There must be a profit in a business or it will drive the operator to bankruptcy. And if there is not a profit there is something wrong somewhere. Either the person is not adapted to his business or the drawbacks are too serious to cope with. First of all a man should be happy and enjoy the work he is doing, find pleasure in meeting its requirements and overcome the difficulties.

Profit as a rule means success and success in anything is the overcoming of the obstacles which stand in the way of a perfectly straight and smooth road to the desired object.

One must have sufficient faith in the venture to start with that he will select a good site or give it its proper place on the farm.

The pear will not do well by you if you don't do well by it. It has been proven that clay land is most naturally adapted to the pear. Then don't set them on sand and expect them to do well. Well, clay is hard to plow and hard to set trees in and it washes badly why won't sand do just as well. Simply because it has been proven that it won't and if it won't there is no use of our trying to make it. Pears on sand are like Job's description of Mortal Man, "Of a few days and full of troubles."

Another thing which stands in the way of pears for profit is the selection of nursery stock, to have it of the right size and age, and true to name.

One agent will tell you he has just what you want and you give him your order but when the trees come you find they are coarse and uneven, some trimmed up so that the first limb is four feet or more from the root. They will never make good trees and a uniform orchard, you want something that you can start about two to two and one-half feet from the ground. If they are big and coarse they haven't good roots, they were all cut off in digging. I have seen trees sold for two years old that showed four years growth. Some of your trees will have big bunches on the roots, crown-gall. Never set a tree that has a sign of gall on it. It will never make a good tree, make them give you good, clean stock. One-year-old stock is my favorite. They are all about the same size, the roots are finer, don't suffer such a shock in transplanting and you can head them as low as you please. Get your stock from the nursery that grew them. They supply their regular trade first, from their best stock and sell the surplus to jobbers and office men.

When the trees get to growing in good shape, keep them trimmed down. Try and make them spread out and take the vase form. Tie sand bags on the end of the branches to make them spread out and go where you want them to. That takes time but a good start is half the race.

Spray the young trees with Bordeaux and Arsenate, don't let the slugs eat them up. They will not grow if the leaves are covered with scab.

When your trees come into bearing, spray in the spring, if you have the scale, with lime sulphur. Then just before the blossom buds open, spray again with Bordeaux or lime sulphur if it is summer or if the weather is damp and warm. This spraying has been the saving of some good crops but it is not essential where lime sulphur has been used for the scale. But just as soon as you think the blossoms have set, or when the petals begin to come down in good shape don't think about your corn ground; don't think about what your neighbor is doing; don't go to town but get right in those pears with your sprayer. Now is the time to strike the scab a death blow and a blow that will keep it out of sight for the rest of the season. You may say you do spray according to the spray calendar "Within a week after the blossoms fall" but still you have some scab. It comes on late in the season in little fine spots, but that is because you didn't meet those petals coming down with your spray going up. A pear with a very small scab will rot in storage and is not No. 1, No. 2's and culls are not profitable.

The leaves are not in full when this spray is made and it takes a lot of material to cover every stem and leaf but thoroughness is positively necessary at this time.

A pressure of 125 lbs. makes a good spray but 155 to 200 makes a very much better one.

Plenty of force to go through the trees and a fine spray to cover all the surface is what is required at this time and I have found this best obtained in a combination of nozzles, such as one of the friend type and a long distance or cala nozzles on a large "Y" using the middle sized holes in the slide of the cala nozzle.

For this spraying Bordeaux or lime sulphur is used arsenate of lead. It is well to make another spraying with the same thing in about two weeks, and the late pears should be sprayed for moth the last of July.

I find thinning is a very good way to make more No. 1 and less No. 2 and makes a yearly crop more sure.

You won't have much blight if you have grown your trees carefully and not allowed them to over bear and grow too much in one season. When it does appear, "Cut it out and forget it." Don't be afraid to put plenty of stable manure on heavily bearing pear trees they will take care of it and give you good returns.

Bearing pears do as well or even better under the mulch system than under cultivation, when the mulch method is thoroughly and systematically carried out.

When you have raised a fine lot of pears don't sell them to the first buyer. There is a good market for good pears and you can find it if you look, I prefer to sell to the local buyer, when I get an honest price, as a general rule I try to avoid the large markets especially in a year of abundant crops.

As to varieties Clapp's Favorite, Bartlett, Howell, Bose, and Kieffers make a very good combination.

Judging from what I have been able to gather and observe the setting of pear trees has not kept pace with other kinds of fruit trees especially the peach and apple, and in some of the older pear centers the industry has been very much decreased by the ravages of blight and other causes.

So to those who have the proper soil and are willing to give it its required care, the pear offers as bright or even a brighter future than many other kinds of fruit.

DISCUSSION.

A Member—I set out some Kieffer pears and they started in good shape, and all at once the blight came in and killed the trees. Is that regular blight? Or was it some fault of the setting?

Mr. Chatfield—It is very seldom that Kieffer pears blight at that age. I have seen it on Kieffer pear trees at a later date, when they were older. Perhaps they did not have moisture enough, may be dried out.

The Member—They started all right.

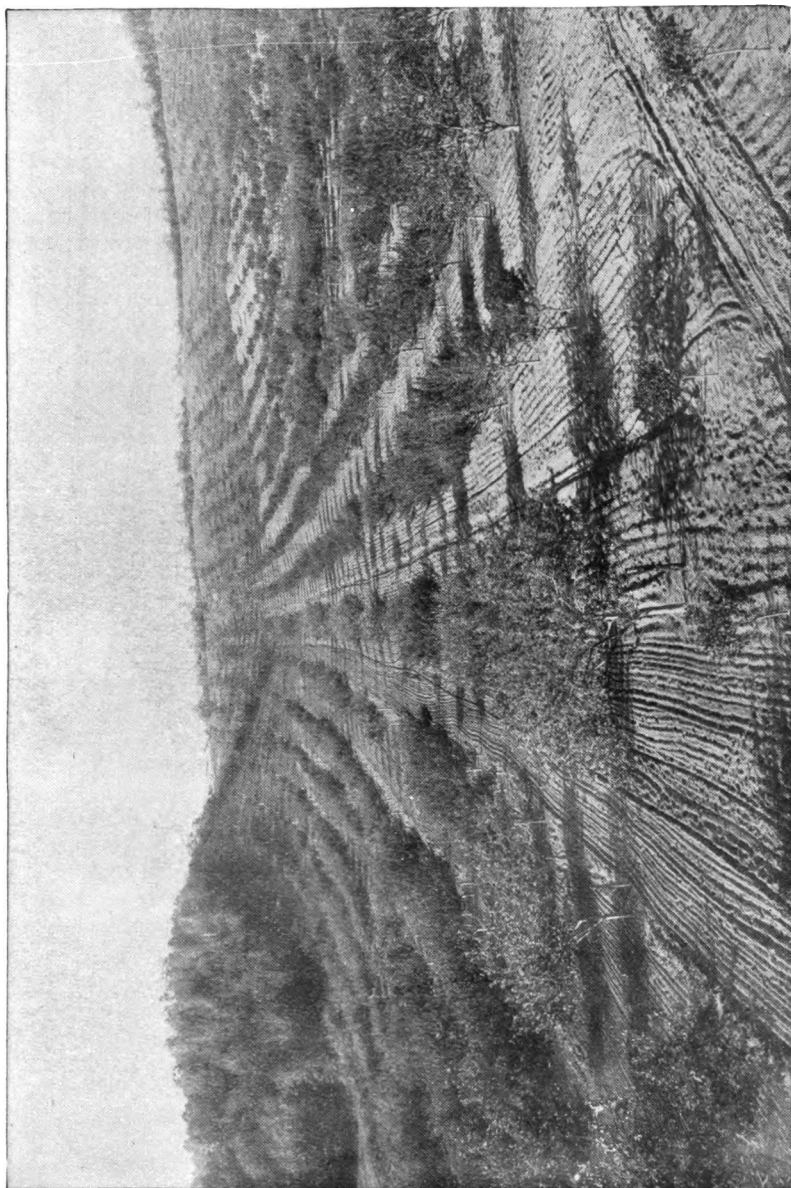
Mr. Chatfield—If the ground was quite stiff clay, and was not well cultivated, it would be pretty apt to be lack of moisture.

Mr. Rowe—I would like to know how you control the pear psylla?

Mr. Chatfield—We have not had much trouble with this since we began to use lime-sulphur. Some of my neighbors have had it, and one in particular I know does not spray very thoroughly.

A Member—What time should we spray?

Mr. Chatfield—Spray when dormant.



A Fifteen-year-old Apple Orchard Worth \$1,500 an Acre. E. Harvey Wilce, Leelanau County.
Courtesy of the West Michigan Development Bureau.

A Member—Does that kill the nits and eggs?

Mr. Chatfield—The eggs are deposited in the little buds, and they are smothered underneath there—that is the theory. The pear psylla has not made any advance in our districts since beginning to spray with lime-sulphur.

Mr. Rose—We have had a little trouble, but we are on sandy soil. I sprayed just at the time they were hatching. I am something like the man born blind and did not get his eyes open until he was fifty years of age. Perhaps if we had done that earlier, it would have killed them. We have a pear orchard eighteen years old, with 2,000 trees in it, and it has been a good yielder, and it is on sandy soil.

A Member—What subsoil do you have?

Mr. Rose—We have some clay—we found it when driving our well, 75 feet below the surface. (Laughter.)

Prof. Green—We have had considerable experience with pear orchards, and we think the time to spray for the scab that gets on the tree is just as soon as the petals drop.

A Member—The Kieffer and Bartlett has been named, why is not the Seckel pear named.

Mr. Rose—It is the standard of excellence, but not the standard in regard to returns in my experience. The Seckel will bear abundantly, but it takes too many of them to make a bushel. However, I have 500 Seckel pears, and I get as many per acre as of anything else, and they are on sandy soil.

A Member—What do you use, Mr. Rose, on that sand to fertilize your pears?

Mr. Farrand—That subsoil 75 feet down. (Laughter.)

Mr. Rose—As a rule we have given the pear orchard no stable manure of any kind, but we have during the last two or three years given it a 1,000 pounds of high grade commercial fertilizer. We do it on account of the cherries, not so much on account of the pears. We always put cover crops on every summer, which is turned under. We sow clover in August in part of this pear orchard where the land is thin, with nothing else, and harrow it in with a steel harrow, and then plow it under one year from that time. We had a great deal of trouble in plowing it under. We did not want to plow our orchards. We did not believe in a plowed orchard. That orchard was never plowed before in fifteen years. Generally we sowed Canada field peas, buckwheat, sometimes oats. The green aphid was quite a menace to our pea crop.

Mr. Farrand—On this proposition of profit, Mr. Chatfield has simply given you the varieties that brought the most profit to him; Mr. Rose has given what was profitable to him. In planting an orchard that is the proposition that is up to each of us—we must plant the variety or varieties that will bring us the most profit.

Mr. Munson—I had an order for Seckel pears, for canning purposes, and I shipped them, and immediately I got a letter back complaining of them, saying that they were so small that with them their size was against them.

Mr. Rose—Of course there is a difference as to where you market your pears. If you had sent them to Pittsburg or some other point in the east where they are known and appreciated, it would have been different.

When I have a carload I send them east and always get a good price. We have done fairly well in Minneapolis and St. Paul, but we have found Pittsburg the best market for the Seckel pear that we know of.

Mr. Farrand—I ran across a man last season who was digging up an orchard of Bartlett pears twenty-one years old. They had never had any blight, and the reason why he was doing this was because the orchard was not profitable. On the same farm was ten acres of Kieffer pears that had always been profitable. But imagine a man digging up ten acres of Bartlett pears, twenty-one years old, because they were not profitable. It seemed like a shame.

Mr. Rose—The trouble must have been that there was some mistake in handling them.

Mr. Keasey—I just want to tell a little incident. My wife and I one day met two men who were on their way to Mr. Chatfield's, they said, to make trouble, because he was spraying when his trees were in bloom. I told them they need not go there if trouble was what they were after, for I was doing the same thing and we drove on a little further and stopped at a neighbor and found he was doing the same thing. Mr. Chatfield did not get into trouble, neither did we.

A Member—We raise pears on sandy as well as on clay soil. I can raise as good pears on one kind as on another. I had a failure and then I began spraying just before the blossoms opened. So far as the matter of soil is concerned, I do not know how to account for the difference. Perhaps the difference is due to location, but I have never seen pears blight to any extent on sandy soil, while I have seen on clay soils whole orchards taken off by blight.

Question—I would like to inquire if the Kieffer is self-fertilizing? I have an orchard of 1,000 Kieffer pears, an ideal orchard, very healthy, but they have never borne 100 bushels of pears, and the orchard is fifteen years old.

Mr. Farrand—I could not answer the question.

A Member—There are many in our neighborhood who are raising Kieffer pears all right, and they are profitable.

A Member—I planted an orchard, taking for my authority a Washington Bulletin, and in this I planted every fourth row running north and south in Bartletts, and the trees fertilized all right. Since then I have learned the same high authority that they would not fertilize. But to-day the Kieffer pears from this orchard are selling for fifty cents a peck in Chicago. And here I would like to say that I do not think many are catering to a select enough market—we can do something better than many are doing.

Mr. Farrand—It would be my advice that Mr. Keasey would do well to graft his trees to Bartletts rather than pull them out. In this way he could save the years of growth.

Mr. Keasey—I think I will.

A Member—What is the best market pear?

Mr. Chatfield—The Bartlett, by all means.

A Member—Is it absolutely certain that the Kieffer can be top-worked to another kind?

Mr. Chatfield—Yes, it is.

A Member—Is it a success?

Mr. Chatfield—No; at least that is my opinion. I have grafted

Kieffer pears when set two years, and they grew at least three feet that season, and that winter they all winter-killed. I have seen all the different kinds of varieties grafted on Kieffer, the top would outgrow the trunk to such an extent that they would not stand a crop.

A Member—In how many years?

Mr. Chatfield—These trees are about fifteen years old.

Mr. Bassett—I top-worked the Kieffer pears, the Seckel, the Bartlett, Sheldon, etc., and the results have been fairly good but the union is bad, a big knobby union. Then another thing we lost quite a number by blight. I do not know whether it was because the Kieffer throws so much sap, but we lost a great deal of the top. I hesitate to advise people to top-work Kieffers.

A Member—Some says, "Give all the manure the ground can take, and you will have lots of fruit." I tried it for three years sprayed thoroughly, and the trees were loaded every year but one, and that year the frost hit them. So I say, give the trees all the manure the ground will take, and you will get lots of fruit.

A Member—I have one hundred trees of Kieffer pears, not come into bearing, and I changed and grafted the most of them into Bartlett and Seckel. In this way I got rid of my Kieffer pears and in this I think I had that much sense anyhow.

Question—How long have they been grafted? And how do they look?

Answer—They look first rate.

A Member—This point was brought up last year at Benton Harbor, and I would like to have you come out to my place and see this pear-grafting proposition on Kieffers. I have some trees that are grafted on Bartletts mostly, and I would not care to see anything that looks any more satisfactory than those trees, yet Mr. Bassett says they have not done well in his orchard.

Mr. Farrand—I think a good way to leave this is that if you have Kieffer pears, and have planted them, and do not want to go on and grow Kieffer pears, you can decide as to whether you will graft them over to some other variety, and then if they do not do all right take them out.

COLD STORAGE FOR FRUIT.

Following a very interesting address on "Cold Storage" by Prof. H. J. Eustace, which was illustrated by a number of charts, the following discussion was held:

A Member—Do you use sawdust on the ice?

Prof. Eustace—No, we do not.

Q.—How often is this filled?

Prof. Eustace—Two or three times a week during the season when we are putting in very much warm fruit.

A Member—How cool could you make the room?

Prof. Eustace—Thirty-two degrees and you can make it ten to twenty degrees less, depending upon the amount of salt used.

The more salt you use the colder the room can be made.

A Member—How often do you fill that box?

Prof. Eustace—That depends upon the amount of fruit you desire to cool. When we have lots of fruit it takes twice the amount that it would otherwise.

A Member—How many tons of ice are required for a thousand bushels of apples?

Prof. Eustace—It will require 125 to 175 tons of ice.

A Member—Does it take as much ice to run this gravity plant system as it does the ice and salt in pipes run through the house itself?

Prof. Eustace—No, it does not, that is our advantage of it.

A member—Is there any objection to putting these pipes for refrigeration in the cellar?

Prof. Eustace—No, you must have the tank room higher than the room in which the crates are.

A Member—How about ventilation?

Prof. Eustace—You must provide for that. Arrange to admit the cold air at the bottom of the room and let the warm air out at the opening at the top.

A Member—Where are those pipes?

Prof. Eustace—Right up against the wall.

Question—What objection is there to the snow accumulating on the pipes?

Prof. Eustace—After it has been allowed to accumulate and get thick you don't get as much cold from the pipes as you should. It acts as a kind of insulator on the pipes and has to be gotten off in order to get the best cooling effects from the pipes.

Question—How low a temperature is it safe to go for apples packed in barrels, or unpacked?

Prof. Eustace—Water will freeze at 32°. An apple will freeze at 28 or 29 degrees. The apple is not just the same as water but it is not safe to go below 28 or 29 degrees with apples. An apple that is frosted will come out all right provided thawed out gradually but the trouble is that they thaw out too quickly.

THE MICHIGAN FRUIT GROWER'S OPPORTUNITY.

C. B. COOK, OWOSSO.

Michigan is pre-eminently a fruit-growing state. The vast extent of her lands adapted to a wide range of hardy fruits emphasizes her magnificent opportunity. While she leads all other states in the Union in the production of other vital products, her fruit areas are her choicest heritage. To bring Michigan to her own and develop to a reasonable degree those areas that will make it possible for her to successfully lead the world against all comers in her favored lines of fruit production is the duty of her fruit-growing fraternity.

With a soil adapted to all of the best of our hardy fruits; with a latitude that insures the production of the highest quality that can be purchased and with a magnificent water frontage that defies all other areas, where are tempered alike the northern and southern portions of

her commonwealth; all these combine to place within her grasp possibilities that are just beginning to be comprehended.

With such qualifications at her door, it is indeed pleasant to contemplate the development that is rapidly taking place. Her proximity on all sides to the best markets of the New World readily solves a great problem in the successful marketing of her fruit products.

The ever swelling tide of city consumption calls for more and better production in all fruit-growing lines. Never before was the time so opportune for the fruit-growing fraternity of our State to branch out and develop a system of production unprecedented in all history.

Severe lessons, dearly learned in the fruit fields of Michigan, have amply demonstrated the supreme importance of congenial soils, suitable elevations, proper varieties, careful soil maintenance, vigilant care and business methods in marketing. The business fruit grower recognizes today as never before that constant attention to details in every branch of fruit-growing can alone make good in the fruit-growing profession. The time has come when profitable fruit production has gone supremely into the hands of the specialists, leaving the indifferent grower to look to other agricultural lines for a livelihood.

Few lines of business enterprise offer the painstaking citizens, who wish to gradually grow into a delightful and profitable life, a better opportunity.

The fruit-growing opportunity then calls as never before for earnest, honest workers; men who are devoted to the cause they espouse and propose by loyal effort to push it through to a termination that brings a comfortable profit, a satisfaction well worth while, and a life-long employment in a line of industry that makes for health, happiness, independence, a good home and wholesome surroundings.

Such is the Michigan fruit grower's opportunity. Royal in its setting, glorious in its achievement and substantial in its results.

MICHIGAN THE BEST.

BY J. J. SNOOK, ROCHESTER.

To live, and where; is question great;
In town or country, or what state,
Where many kinds of work and wealth
Shall help the pocketbook and health.
So we this good advice will give,
In Michigan's the place to live.

Why? Cause of great variety,
The like of which no where you see;
Its soils, its factories, and its ores
That bring the markets to our doors.
So many things that profits give;
In Michigan's the place to live.

And such great lakes, on three sides round,
With waters clear its sides to bound;
Where steamers glide and barges sail,
Competing traffic with the rail.
Now this true statement we will give,
It pays in Michigan to live.

She has a thousand miles of shore,
 Perhaps 'tis less—it may be more,
 Which need no fences there about
 To keep stock in, or stray ones out.
 Now why not take the advice we give,
 In Michigan, to come and live?

Where inland lakes on highland plane
 By hundreds laugh in glad refrain;
 There shiners you may catch with joy.
 Like father caught, when but a boy.
 These charms, with others, we might give;
 In Michigan, come, fish, and live.

And fruits, well say, these great fresh seas
 Temper the winds to soothing breeze
 That shield the bud and save the bloom
 For happy wife and thrifty groom
 These fruits you'll have to sell and give,
 In Michigan's the place to live.

And best of all, the people here
 Will welcome you with help and cheer;
 So you will find 'twill surely pay
 To say, right now, we'll go that way
 'Mongst friends that good advice did give.
 And in grand Michigan we'll live.

Rochester, Mich., Jan. 12, 1912.

VARIETY LIST FOR MICHIGAN.

T. A. FARRAND, EATON RAPIDS.

In looking over this list the reader must take into consideration the fact that the value of this or that variety depends somewhat upon the purpose for which it is wanted, and also very much upon local or long distance markets. The list must necessarily be long to cover all conditions and the different sections of the state and those varieties should be chosen which have the characteristics most desirable for the purpose for which they are being planted. The recommended variety list is also subject to change more or less as the years go by. The popular variety of today may not be such ten years hence.

The lists should be divided, one list being for market purposes and one for home use. The list for home use should contain those varieties best adapted for cooking and dessert purposes and should cover the season. Some of the desirable characteristics for market fruits are hardiness of tree and early bearing tendencies, high color, reasonably firm in texture, coupled with good quality if possible.

APPLES.

Why should we in Michigan plant varieties of good quality, eliminating varieties of the Ben Davis type? For the very reason that we cannot compete with many other sections, where this is a standard

variety, but we can grow many other varieties of fine quality to perfection.

For market:—Yellow Transparent, Duchess of Oldenburg, Wealthy, Wagener, Hubbardston, McIntosh or Fameuse, Grimes Golden, Jonathan, Baldwin, Northern Spy, Red Canada, King, Rhode Island Greening, Ontario.

For Home Use:—Yellow Transparent, Sweet Bough, Wealthy, Oldenburg, Fameuse, McIntosh, Spitzenburg, Jonathan, Spy, Grimes Golden, Red Canada, Hubbardston, Tolman Sweet.

Crab Apples:—For market, Hyslop; for home use, Martha and Dartmouth.

PEARS.

For market:—Clapp's Favorite, Bartlett, Duchess, Seckel, Dana's Hovey, Clairgeau, Keiffer.

For Home Use:—Summer Doyenne, Bloodgood, Clapp's Favorite, Bartlett, Manning, Elizabeth, Duchess, Bell Lucrative, Sheldon, Bosc, Seckel, Lawrence, Dana's Hovey.

PEACHES.

For Market:—Admiral Dewey, St. Johns, Conklin, Engle Mammoth, Kalamazoo, Elberta, Gold Drop, Smock, Salway.

For Home Use:—Admiral Dewey, Lewis, Engle, Champion, Kalamazoo, Gold Drop.

PLUMS.

Market Varieties:—Japan—Red June, Abundance, Burbank, Satsuma, October Purple; European—Lincoln, Lombard, Bavay Green Gage, Bradshaw, Geuii, Grand Duke, Black Diamond, Monarch, Coe's Gold Drop, Shropshire or French Damson.

For Home Use:—Red June, Abundance, Lincoln, Columbia, Lombard, Bavay Green Gage, Fellemborg or Italian Prune, Shropshire Damson.

CHERRIES.

Market Varieties:—Richmond and Montmorency for sour, Dukes, Montreuil, Sweet—Napoleon Royal Ann, Windsor, Black Tartarian, Smith's Bigarreau, Yellow Spanish, Bing, Lambert.

For Home Use:—Early Richmond, Montmorency, May Duke, Montreuil, Eugenie, Gov. Wood, Tartarian, Windsor, Yellow Spanish.

QUINCES.

Orange, Rea Mammoth, Missouri Mammoth.

GRAPES.

Market Varieties:—Moore's Early, Worden, Concord, King, Diamond, Niagara, Delaware.

For Home Use:—Winchel or Green Mountain, Moore's Early, Diamond, Worden, Niagara, Delaware, Brighton, Ulster.

STRAWBERRIES.

Market Varieties:—Senator Dunlap, Dornan, Sample, Aroma, Gandy, Downing's Bride.

For Home Use:—Marshall (very best quality), Senator Dunlap, Brandywine, Wm. Belt, Michel's Early, Gandy.

RASPBERRIES.

Market Varieties:—Black—Eureka, Conrath, Cumberland, Kansas, Gregg, Plum Farmer.

Red—Early King, Cuthbert.

Purple—Columbian, Shaffer.

For Home Use:—Eureka and Cumberland, black; Early King and Cuthbert, red; Columbian, purple.

BLACKBERRIES.

Market Varieties:—Early King, Erie, Minnewaska, Snyder, Wilson, El Dorado.

For Home Use:—Early Harvest, Eldorado, Snyder (very hardy).

GOOSEBERRIES:

Downing, Champion, Chautauqua.

CURRANTS.

London Market, Fay's Prolific, Wilder.

USE OF COMMERCIAL FERTILIZERS.

PROF. A. J. PATTEN, AGRICULTURAL COLLEGE.

It is not possible for any man to predict with certainty what the return will be from the use of any particular fertilizer, because so much depends on the season, the physical condition of the soil, etc. It is safe to assume that a soil is lacking in something when it fails to produce a good, average crop, say 40-50 bushels of shelled corn or 25-30 bushels of wheat per acre. For all soils under good climatic conditions should be able to produce the above amounts of grain when properly handled. The failure of a soil to yield average crops may be due to several causes, among which may be mentioned the following: improper drainage, improper tillage, unfavorable climatic conditions, lack of moisture, lack of humus, acidity, lack of available plant food.

It will be readily seen from this that only one of these conditions can be remedied by the addition of commercial fertilizers. If the other conditions exist, they should, as far as possible, be corrected before any form of commercial plant food is used. It will be readily seen that all of these conditions except one, are within the power of man to control, at least to a certain degree.

Drainage. It is not an uncommon sight, especially in the spring, to see large areas in fields where the water is standing anywhere from a few inches to a foot or more in depth. In such cases it is late in the season before the land is in a condition to be worked; consequently if a crop is sown, it is late in getting started and furthermore, such places are liable to be flooded with every heavy rain. In some soils the water may not stand upon the surface, but come to a level within a few inches of the surface. Such soils can be benefited only by a drainage system that will carry away the excess of water. Commercial fertilizers cannot take the place of drainage.

Cultivation. The advantages to be derived from cultivation are many. It keeps the ground in good physical condition, makes available some of the insoluble plant food, kills weeds, and when done at the proper time, conserves soil moisture. Commercial fertilizers cannot take the place of cultivation.

Unfavorable climatic conditions are beyond the control of man. Commercial fertilizers cannot overcome unfavorable climatic conditions.

Moisture. The soil moisture may be controlled to a certain extent by judicious rolling and cultivation. Commercial fertilizers cannot compensate for lack of moisture.

Humus is decayed and decaying organic matter. It plays an important part in the fertility of a soil. It helps the physical condition, conserves moisture, makes available some of the insoluble plant-food. Humus may be supplied by adding barnyard manure or by turning under green manures, such as clover, cowpeas, rye, etc. Commercial fertilizers do not add humus to the soil.

Soil Acidity. Soils may become acid as a result of the decomposition of organic matter and possibly from other causes. Some plants are

particularly sensitive to an acid condition of the soil, especially alfalfa and clover. Soil acidity may be corrected by the use of some form of lime. The forms of lime generally used for agricultural purposes are the following: Burned or stone lime, air-slaked lime, ground lime stone, and land plaster. Burned lime is the most active form of lime and is quite caustic. It is usually obtained in lumps and must first be slaked before it can be applied. This is conveniently done by putting it in small piles and sprinkling just enough water over it so that it will break down into a fine powder, or the piles may be covered with moist earth and allowed to stand until it breaks down into a powder, when it may be spread with a shovel.

When the stone lime is exposed for some time to the atmosphere, it gradually takes up moisture and breaks down into a powder form, when it is known as air-slaked lime. Lime can be purchased in this form and it may be applied with a drill or lime spreader. An objectionable feature to the use of either of these two forms is their causticity, which renders them disagreeable to handle.

The ground lime stone is now being prepared in this state and can be obtained at reasonable rates. This form of lime is not as active as the two mentioned above, but it has the same effect upon the soil and undoubtedly is much safer, to use, especially when the lime must be applied immediately before the seed is sown. One hundred pounds of ground lime stone is equal in neutralizing power to fifty-six pounds of burned lime or seventy-four pounds of air-slaked lime.

Land plaster was formerly used to quite a large extent both in the United States and Canada, but at the present time its use is very limited. Since the lime in land plaster is already fully saturated with the acid radicle of sulphuric acid, it cannot neutralize soil acidity, and its beneficial effects are supposed to be due to its power of making available some of the insoluble potash compounds in the soil.

Marl is another form of lime that is more or less abundant in the state. It is often found underlying marshes and along shores of small lakes, and when it can be gotten out at not too great an expense, it is a valuable form of lime to use for agricultural purposes. The lime is in the form of the carbonate, the same as the lime rock and it varies in purity from 50% to 60% calcium carbonate to nearly 100%. On account of the large amount of water which it contains in its natural condition, it is not profitable to transport it for any considerable distance without first drying it.

Available Plant Food. The availability of the plant food in a soil is dependent upon several factors, the most important being those mentioned above. When all of these conditions have been fulfilled, it may then be profitable to use commercial fertilizers. It is a self-evident fact that the farmer who sells the greater part of the product of his farm is slowly but surely depleting the stock of plant food in the soil, and it is not unreasonable to assume that under such conditions the time will come sooner or later when the soil will become unproductive for an actual lack of available plant food. Such deficiency may be supplied by commercial fertilizers. The dairyman or stockman who feeds the product of his farm to his cattle and judiciously cares for the manure and puts it all back on the farm, need have but little fear of depleting the store of available plant food in the soil, because the actual

fertility that is sold in the form of butter-fat or beef is not very great. Besides the concentrated feeds that are bought would probably compensate for the loss of fertility in the sale of the products.

The amounts and kind of commercial fertilizers to be used depend upon the kind and condition of the soil and also upon the crops to be grown. No specific recommendations can be made at this time and we shall only attempt to give some general directions for a few of the more common soil types in the state. In certain sections of the state very large areas are made up almost exclusively of light, sandy soil, and they are generally referred to as unproductive soils. There are, however, many cases on record where, by a wise method of handling, these soils have been made very productive. Undoubtedly the greatest need of such soil is organic matter or humus and this is probably more easily supplied, at least in the beginning, by turning under green manures. These soils must be well supplied with organic matter at all times, since it betters the physical condition and greatly increases the water-holding capacity.

Commercial fertilizers are very liable to meet with failure on such soils unless the humus supply it kept up. Farmers' Bulletin No. 323 of the United States Department of Agriculture, Washington, D. C., recommends methods for handling these soils, based upon observations made in Michigan, Wisconsin and Minnesota. This bulletin may be obtained by applying at the United States Department of Agriculture.

These soils are quite generally deficient in nitrogen, but this may and should be supplied very largely by turning under legumes, as most of these soils grow clover very successfully.

Whether any forms of phosphoric acid or potash should be added will depend very largely upon the crops grown and should be determined by actual experiment.

Clay soils are universally spoken of as strong soils and they will generally respond to good cultivation methods for a good many years without any apparent decline in fertility. What is true of the sandy soils in regard to humus is equally true of the clay soils, though the effects of a lack of humus is evidenced in a different way. Clay soils deficient in humus become heavy and soggy, and are very liable to puddle after a heavy rain and to bake so hard as to render them almost impossible of cultivation. Humus will correct these faults by making the soil more open and porous, so that the air may circulate more freely and it will prevent puddling and baking. These soils are more liable to be deficient in available phosphoric acid than either of the other essential plant-food elements. The kind and extent of fertilization will depend upon the kind of crops to be grown.

The loam soils are gradations between the heavy clays and light sands and are generally productive soils. The same general considerations will apply to these soils as to the clays and sands.

Muck soils are almost invariably deficient in potash and as a rule will respond to applications of this material. This has been conclusively demonstrated by experiments carried on in our neighboring states as well as in our own state. Muck soils also generally respond to applications of barnyard manure.

PLANTING ORCHARDS IN MICHIGAN.

Reprinted from Bulletin No. 262.

This bulletin has been prepared to meet the constant and growing demand for information on the general subject of planting orchards in Michigan. It has been written by Mr. O. K. White, Field Agent in Horticulture, and is based upon his experience and observations as a successful fruit grower.

In the discussion of varieties an effort has been made to avoid technical terms in describing the tree and fruit, and to mention such merits, faults and peculiarities of the varieties as may be useful to any one who has to decide the important question of selecting them. The list presented has been carefully examined and approved by Mr. Benton Gebhardt, of Hart, Oceana county, one of the most successful and experienced fruit growers in Michigan.

H. J. EUSTACE,
Horticulturist.

SITE AND SOIL FOR AN ORCHARD.

The success and profitableness of an orchard depends so largely upon the site and soil that it behooves the prospective fruit grower to give to these features careful consideration, before he ventures into the business.

The site for an orchard should not be low or level, but should be more or less rolling and have an elevation somewhat higher than is common to the vicinity or section. Such a site supplies good air drainage. Cold air is heavier than warm air and always sinks to lower levels, hence low grounds are more subject to frosts and severe winter freezing. Such disastrous results as occurred at the time of the February freeze of 1899 and the October freeze of 1906, are still fresh in the minds of many Michigan fruit growers who had orchards on low level lands. Many of the orchards, which had until these times been very successful, were practically destroyed. Even on higher lands, pockets must be avoided because cold air settles in them and cannot get out. It is not necessary that a site be extremely hilly or that the orchard be located upon high hill tops. In many cases it would be better to avoid hill tops on account of their exposure to winds and their tendency to severe soil washing. Abrupt hillsides should also be avoided because of the difficulties encountered in spraying, tillage and harvesting.

The slope and exposure of a site has some bearing upon its desirability for the planting of an orchard. Generally a south slope has a lighter soil and warms earlier in the spring than a northern or eastern exposure. This induces earliness in blossoming and ripening of fruit, which is sometimes desirable. On the other hand, trees on a southern

exposure are much more subject to winter killing and sunscald. Generally, northern or eastern exposures are preferred by fruit growers, because they usually have strong soils, are more retentive of moisture, and are not so susceptible to winter injury or late spring frosts.

It must be understood that some fruits are hardier than others. The apricot is so tender that it seldom does well in Michigan. As long as winters are mild it may do fairly well, but it is almost certain to be killed by the first severe winter, even though planted on the most favorable location. The peach is nearly as tender, while the plum follows very closely. Apples, pears and quinces are not as tender or as sensitive to extremes of cold as peaches and plums, and hence it is not as imperative that they be given such careful consideration in the location of a site for an orchard. Their blossoming later in the spring is also another point in their favor.

The different fruits require different types of soil, but all do their best on a strong, deep, well-drained soil. Trees cannot thrive upon soils that are depleted, shallow, or poor in texture, where an impervious hardpan is near the surface, or where they have "wet feet." Examples of failures, due to these conditions, are not uncommon. Stunted trees, or blank spaces in the low spots of an orchard usually indicate poor soil drainage or poor air drainage or both. Artificial drainage may sometimes be resorted to, in order to make a location suitable for an orchard, but ordinarily such a procedure is not satisfactory, especially in a commercial orchard. For a home orchard, which it is highly desirable to have near the house, artificial drainage may be frequently used to take advantage of a desirable location.

A soil can be too dry for fruit trees. Such is the condition of some of Michigan's sandy soil, which is so porous and devoid of humus that it cannot retain moisture. Trees on such soil invariably lack in vigor, productivity and hardiness. In the case of peaches.* "Either extreme of moisture—excessive wetness or excessive dryness—gives favorable conditions for winter killing. The wet soil is conducive to sappiness in a tree, and also freezes deeply. Severe cold, especially if alternating with warm weather, or accompanied with dry winds, causes evaporation of water from the trees, and if the soil be so dry as not to furnish moisture to replace the evaporated water, harmful results ensue."

The soil that is shallow, or devoid of plant food, cannot be expected to produce an orchard and keep it in vigorous health and productivity. While plant food can be added to the soil, it is a factor which the orchardist must not overlook or underestimate, because it is just as necessary that an orchard produce a good strong growth in the first few years of its existence as after it comes into bearing. Scores of orchards in Michigan, today, are unhealthy and unproductive simply because they were planted upon soils deficient in plant food.

Soils best adapted to apples may vary from a rich, sandy loam to a clay loam, while pears prefer a clay loam or a pure clay, provided it is of a good texture. Plums and cherries usually do best on a medium loam, and peaches on a soil ranging from a sandy nature to a medium clay loam. While it is conceded that the nature of a soil may be influenced greatly and its adaptability to different fruits made possible to

*Hedrick, U. P., Mich. State Hort. Soc. Rept. 1907, p. 56.

a greater or less extent by the use of lime, manures and commercial fertilizers, yet it is important to emphasize the wisdom of selecting a soil best suited to the fruit that is expected to be raised, or to plant only those fruits best suited to the soil one already has.

PREPARATION OF SOILS FOR AN ORCHARD.

The preparation of soil previous to the planting of an orchard will depend entirely upon its nature, its texture and its condition of fertility. It is generally agreed that a field should be brought into the best possible state of cultivation before it is planted to fruit trees. If young trees are planted in a soil that is not in a condition to induce a strong, vigorous, healthy growth, throughout the first few years of their lives, the orchard will never be as healthy, productive, or bring as good returns as it would have done if the trees had been given a good start, and the lack of clean and thorough cultivation previous to planting the trees makes it much more difficult and expensive after the trees are planted. Not only should the preparation of soil be clean and thorough, but it should be deep. The soil should be loosened up as deeply as possible with the plow. On some soils it is highly desirable to use the sub-soil plow, running it to a depth of from 16 to 20 inches. Soils which are naturally loose and subject to leaching would be possible exceptions, and should be treated in a way to avoid leaching.

While it is not desirable to select for an orchard, soils which need artificial drainage, yet if such is chosen, it should be underdrained with tile. Since trees are intended to occupy the land for a longer period of time than ordinary crops, the grower can afford to give the soil better preparation than for ordinary annual crops.

In most cases it will be a decided advantage to devote the land to hoed crops, such as potatoes, corn or beans for one or two years, before planting the orchard, so that all weeds can be subdued and the soil worked into a good condition. At the same time, any poor portions of the field can be easily located and improved. If the soil is badly depleted, it would be advisable to seed it to clover and turn under the sod before planting. If the trees are to be planted in the spring, it is better to plow the soil in the fall, unless the slope is such as to wash badly. The alternate freezing and thawing during the winter will assist greatly in pulverizing and mellowing the soil.

FALL OR SPRING PLANTING.

The advisability of fall or spring planting depends upon several conditions. Fall planting has the advantage over spring planting in that the trees become firmly established in the soil before winter sets in, and are able to start growth in the spring before the ground can be marked and put into condition for planting. This is important because the trees get a good growth in the early part of the season, before the summer

drouths occur. On the other hand, there is more or less danger from winter injury during a severe winter or from the drying out of the trees if the winter is long and dry. Fall planting is much more successful with the hardy apples and pears than it is with the tender plums, cherries and peaches. In Michigan, it is seldom safe to plant peaches, sweet cherries, or apricots in the fall.

The convenience of the season will determine in a majority of cases whether or not the planting shall be done in the fall or spring. Very often the rush of spring work induces the grower to hurry his planting, or to do it carelessly, and as a result a poor stand is secured, with crooked rows. Others have large crops to harvest in the fall, and would find it more convenient to do the planting in the spring. If there is any doubt as to the best time to plant, let it be done in the spring, and as early as the ground can be gotten into proper condition.

DISTANCE FOR PLANTING.

Most of the old Michigan orchards, especially of apples, were planted too close. Trees produce not only large tops, but develop extensive root systems and are wide feeders. They should be planted far enough apart so that they will not interfere with each other, or if planted more closely than the proper distance, the plantings should be done in such a way as will later permit a judicious thinning of the trees. Another disadvantage in planting trees too close together is the serious difficulty which will be encountered in the operations of spraying and cultivating. In orchards where trees are close together not only is the spraying more difficult, but diseases and insects thrive more easily. For the same reasons the outside rows should not be located too near the fence.

The distance apart that fruit trees should be planted depends not only upon the kind of fruit to be raised, but in many cases upon the variety. Some varieties differ greatly in vigor and habits of growth from others, and requires greater distances; for example, the Northern Spy apple as compared with the Wagener, the Crawford peach as compared with the Gold Drop, the Grand Duke plum as compared with the Wixom. Trees planted upon strong soils require greater distances than on lighter soils, because they will usually live longer and make a much more vigorous growth of top and root. However, if the grower has clear and definite plans to do repressive pruning, he may reduce the standard distances somewhat. Close planting should not be attempted unless a man knows how and is sure to continue his practice of heading-in the trees every year.

Safe distances for planting under ordinary and normal conditions in Michigan are:

Apples, 33-40 feet, or even 45-50.

Standard pears, 20-25 feet.

Dwarf pears, 10-12 feet.

Peaches, plums and apricots, 20-24 feet.

Sweet cherries, 25-40 feet.

Sour cherries, 18-24 feet.

Quinces, 10-12 feet.

DOUBLE PLANTING AND FILLERS.

There are few farmers who care to or can afford to plant an orchard, cultivate, prune and fertilize it properly without getting back some returns for the investment and labor before the trees produce profitable crops. This difficulty may be overcome by growing shorter lived fruits, such as raspberries, strawberries, currants, gooseberries, or such annual, cultivated crops as corn, beans, potatoes, or peas, among the trees. If such a plan is adopted, the owner should realize that he must make greater efforts to conserve the moisture and fertility of the soil, or his orchard will permanently suffer. The planting of bush fruits is seldom advisable in a large commercial orchard, for they interfere so seriously in so many orchard operations, especially spraying. The using of fillers or early bearing and maturing varieties should not be undertaken by any except those who are determined and willing to remove them when they begin to crowd the permanent trees, or when the permanent trees come into full bearing.

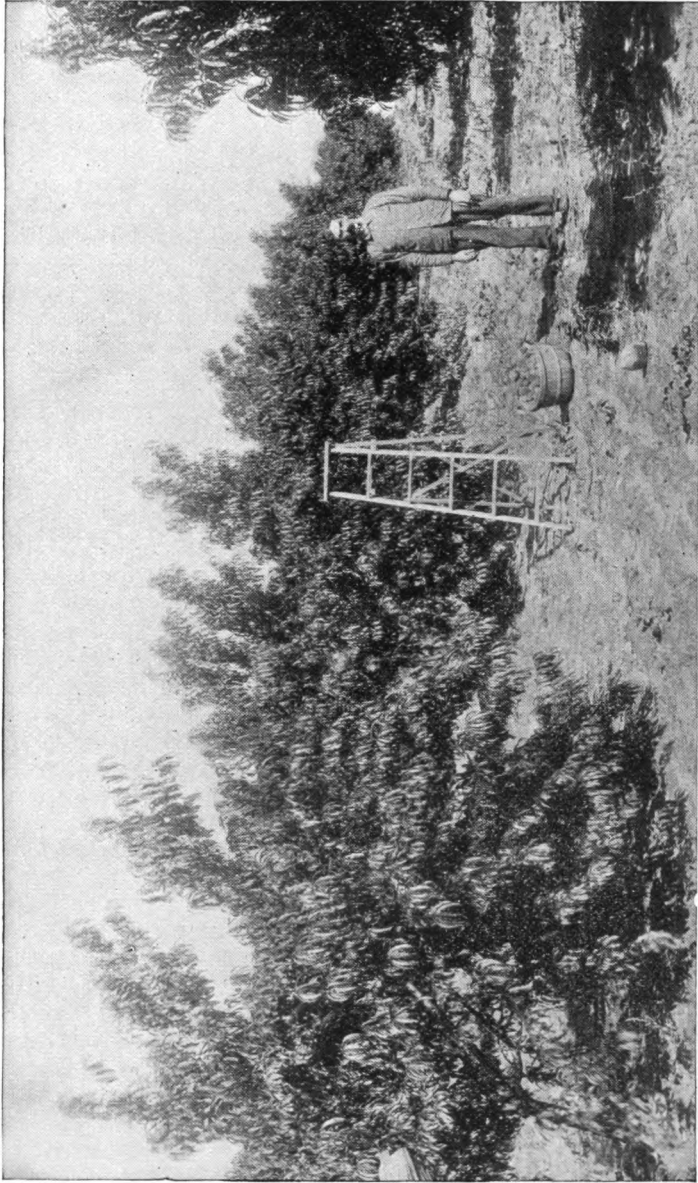
Pears should seldom be planted among apples, as they require radically different methods of cultivation. Peaches or plums are being largely used as fillers, and with considerable success on favorable locations. Their usefulness is about over at 12 or 15 years, but even if not, they should be removed for convenience in caring for the orchard, and to avoid crowding the permanent trees.

If apples are to be used as fillers, such early bearing varieties as Wagener, Grimes, Duchess, Wealthy, or Yellow Transparent, may be used, and then it would be well to plant the permanent trees somewhat farther apart than common.

MIXED PLANTING.

Many varieties will not bear well when planted alone, or in large blocks.

This is because they require the pollen from blossoms of other varieties. Inasmuch as all varieties benefit by cross pollination, it is a good thing to plant four or five rows of one variety and then four or five rows of another, and so on. If the orchardist finds his trees barren from lack of cross-pollination, he may graft every fourth or fifth tree of every fifth row to some variety having commercial value, blossoming at the same time and having an affinity for the barren variety.



Six Hundred Dollars from this Small Peach Orchard in 1910. William A. Wright, Montcalm County.
Courtesy of the West Michigan Development Bureau.

*STERILE AND SELF-FERTILE VARIETIES.

Apples more or less self-sterile: Belleflower, Chenango, Gravenstein, King, Northern Spy, Primate, Roxbury Russett, Spitzenburg, Tolman.

Varieties mostly self-fertile: Baldwin, Greening, Duchess of Oldenburg, Red Astrachan, Yellow Transparent.

Varieties of pears more or less self-sterile: Duchess, Anjou, Bartlett, Clairgeau, Clapp, Howell, Jones, Kieffer, Lawrence, Louise, Mount Vernon, Sheldon, Superfin, Winter Nelis.

Varieties generally self-fertile: Bosc, Manning Elizabeth, Seckel, Kieffer.

Varieties of plums more or less self-sterile: Coe, Fellenberg, Satsuma.

Varieties generally self-fertile: Burbank, Lombard, Damsons, Bradshaw.

TREES TO PLANT.

It is by all means advisable to secure first-class trees. Such trees should be medium in size for their age, free from injurious insects and diseases, should have a healthy root system, with enough good-sized roots to hold the tree firmly in the soil and a good lot of fine roots. Not all varieties have straight trunks, and this should be taken into consideration. Large sized trees should not be considered first-class and should be avoided, as often much of their root system is removed in digging, and they adapt themselves to new conditions with greater difficulty. The extra expense necessary to buy first-class nursery stock will be many times repaid before the trees have outlived their usefulness. It is usually preferable to secure trees from a nearby reliable nurseryman. His soil and climatic conditions are more apt to be like those of the field in which the trees are to be set. The trees are thus saved the unnecessary effort of adapting themselves to new and radically different conditions. However, the importance of this point is doubtless overestimated, as many distant nurserymen may have practically identical soils and climates. Other advantages of patronizing nearby nurserymen are the saving of expense in shipping and avoiding the danger of injury in transit. Then, too, the purchaser can visit the nursery and select his trees, and be more certain to secure what he desires. There is doubtless considerable advantage to the orchardist in furnishing the nurseryman with scions or buds secured from trees of known productiveness, hardiness and health.

There is a growing tendency on the part of orchardists to demand younger and smaller trees. In doing so, they can better shape the top to their desire, retain a much larger part of the root system, and secure a better and more certain growth. Young trees will usually grow faster

*Bailey's Principles of Fruit Growing, page 229.

and more vigorously than older ones. The age at which trees should be preferred from the nursery are: apples, quinces and pears, 2 to 3 years; peaches and sweet cherries, 1 year; plums and sour cherries, 1 to 2 years. There is no material difference between budded and root grafted trees, provided they are of the same size and vigor, except, perhaps, in the North Peninsula, where it would be advisable to get root-grafted apple trees, and secure stock of known hardiness.

The use of dwarf trees is usually confined to pears. While more dwarf trees can be planted upon an acre, and larger fruits can be produced, still they have not found favor among commercial orchardists except in a few sections where an extra high grade of fruit is desirable. Dwarf trees are secured by propagating upon a slow growing root, but will not remain dwarf unless severely headed-in every year.

As soon as the trees are received from the nursery they should be carefully heeled-in the ground, as near the field intended for the orchard as possible, and preferably at the north side of a building or wood lot, especially in the spring, in order to protect them from the sun, keep them cool and retard their development. The trench should be dug sufficiently deep to receive all the roots. The trees should be carefully laid in, with their tops to the south, then fine, moist soil should be put between the roots, so that no air spaces are left. If trees are to be left heeled-in during the winter, care should be taken to remove all packing material which could harbor mice, rats or rabbits, and then snow should be kept over them as a protection from severe cold.

SYSTEMS OF ORCHARD PLANTING.

There are several systems of orchard planting,—the square system, in which the trees are set at the corners of a square, making the rows equidistant in both directions; the quincunx system, which is the same as the square system, except that a tree is planted in the center of the square, and the hexagonal or equilateral triangular system, in which the trees are equidistant apart in all directions.

Of these, the square system is the most commonly used. While it does not permit of planting as many trees per acre as the other systems, it has the advantage of being easily laid out, is the easiest to cultivate and permits of systematic and definite thinning when the trees begin to crowd each other.

It is easily modified into the rectangular system, in which the rows are farther apart in one direction than the other.

The quincunx system permits of the planting of a great many more trees per acre than the square system. The number per acre will be increased from 45% in small orchards to 98% in large orchards. The advantages of this system are similar to those of the square system. The popularity of both is due to the possibility of planting the trees quite thickly, and of thinning with a fair degree of success at what ever distance the trees are set. In such cases early bearing and maturing trees should be used as fillers and planted intermediately between the perma-

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Square system.

Square system with fillers.

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P P P P P F P F P F P

P P P P F P F P F P F

P P P P P F P F P F P

P P P P F P F P F P F

P P P P P F P F P F P

Quincunx system.

Quincunx system with fillers.

P P P P P F P F P F P

P P P P F F F F F F F F

F P F P F P F P

F F F F F F F F

P P P P P F P F P F P

F F F F F F F F

F P F P F P F P

P P P P P F P F P F P

Hexagonal system.

Hexagonal system with fillers.

nent trees. As indicated in the diagrams, the first proper thinning of the square system is performed by removing every other tree and alternating in the rows, and leaving the orchard in the quincunx system. This in turn may be thinned by removing the central tree, leaving the orchard in the square system again. Thus an orchard set 20 feet square, when properly thinned, leaves the trees 40 feet quincunx or in squares 28.28x28.28 feet, running diagonally across the field. This, properly thinned, leaves the trees in squares 40 feet apart.

The hexagonal or equilateral triangular system is popular because it distributes the trees evenly over the field and permits of planting the greatest number of trees per acre at a good distance apart. Approximately 15% more trees per acre may be planted. While it has this advantage, it has also the disadvantage of inconveniencing all cultivation, especially in the turning at the ends of the rows and the necessity of finishing up the corners, and also the impossibility of permitting any satisfactory method of thinning the trees without removing too large a proportion of them. When this system is used, and the trees are planted at ordinary distances apart, the orchardist is almost certain to postpone thinning the trees until they have so badly crowded each other that their vitality is much impaired. Proper thinning requires the removal of 75% of the trees, and this is very hard to do as long as they are healthy and productive.

PLANTING TABLE.

Number of trees required per acre planted by square system:					
10	ft. x 10	ft.....	435	20	ft. x 20 ft..... 108
10	ft. x 12	ft.....	363	24	ft. x 24 ft..... 75
10	ft. x 20	ft.....	217	25	ft. x 25 ft..... 70
12	ft. x 12	ft.....	302	28	ft. x 28 ft..... 55
12	ft. x 15	ft.....	242	30	ft. x 30 ft..... 50
15	ft. x 15	ft.....	135	33	ft. x 33 ft..... 40
16½	ft. x 16½	ft.....	160	35	ft. x 35 ft..... 35
18	ft. x 18	ft.....	135	40	ft. x 40 ft..... 27

LAYING OUT THE ORCHARD.

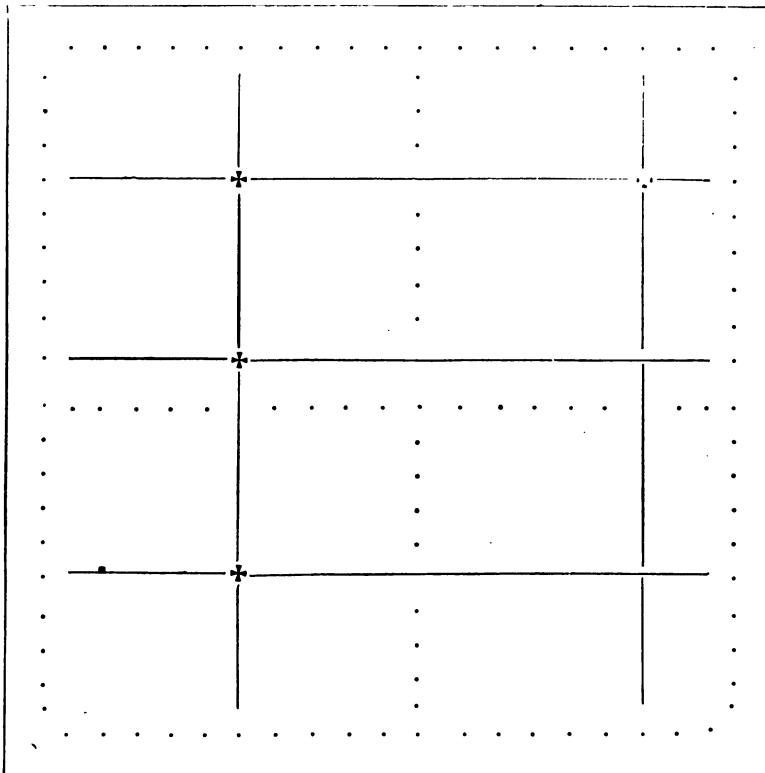
The problem of laying out the orchard is difficult, especially on rolling ground, and should be done carefully, so that the rows of trees may be straight. An orchard in which the rows are straight is much more attractive and satisfactory than one which appears to have been planted carelessly. The extra care and time devoted to aligning the rows of trees will be a source of much satisfaction during the whole life of the orchard.

The first thing to do is to establish a base line along one side of the field, preferably the longer side, and from this to extend all further operations. This should be established by a surveyor if possible, rather than to depend upon a fence line or road line, which are so often erroneous. If the field, to be set by the square or quincunx system, is

not larger than 3 or 4 acres, and is comparatively level, another line should be run out at right angles to the base line, starting at the corner of the field where the first tree will stand. The direction of this line may be ascertained by placing a carpenter's square, or a mason's square upon 3 stakes, one of which is at the corner, another along the base line, and the third along the side line, so that one side of the square extends along the base line. Sighting along the other side of the square, one has the direction of the side line. Stout stakes should be set along this side at intervals corresponding to the distance the trees are to be set apart. Similarly, another line of strong stakes should be set along the opposite side of the field, and at right angles to the base line. From the corresponding stakes of these two side lines, a wire may be stretched tightly across the field, parallel to the base line, and this will indicate the location of the row of trees. Conspicuous tags should be fastened tightly along this wire at intervals equal to the distance apart the trees are to be set in the row. A gardener's string would be just as good if it did not stretch in use, increasing the distance between the tags and causing the cross rows to be crooked. Then stakes should be set in the ground at the location of the tags.

When this is done the holes may be dug and the trees planted with the planting board.

If the field is a large one, a more extensive staking method must be employed. The following simple plan will be found very accurate where the work is carefully done. As indicated in the diagram below, a row



of stakes is established entirely around the field, and near enough to the border of the field to avoid the location of any row of trees, the stakes being placed at intervals corresponding to the distance the trees are to be planted apart. These stakes should be painted or whitewashed at the top to make them conspicuous and easily seen at considerable distances. Then an intermediate row of stakes should be established across the field in each direction. These stakes being put exactly in line with the corresponding stakes on opposite sides of the field and again avoid the location of any row of trees. If the field is at all rolling, or if for any reason the planters cannot see entirely across the field, more intermediate lines will be needed. None of these lines of stakes need be exactly straight, but it is essential that the stakes be set perpendicular. With the stakes thus placed, the proper location of any tree in the field can be easily found, thus the hole-digger may use his shovel handle as a temporary stake and align it with two stakes in each of the two directions at right angles. The location of the handle indicates the center of the hole. In planting, the tree should be used as a temporary stake and aligned with two stakes in each of two directions at right angles. In this method any number of men may plant trees in the field at the same time, and the work may begin in any part of the field. When the planting is completed the stakes stand as a test of the thoroughness of the work done.

In the planning and planting of the hexagonal system, this plan may be used. As many stakes should be provided as there are trees to be planted. A wire should be prepared of the exact length that the trees are to be planted apart, and a ring or loop twisted in at each end by which the operator may hold it. After the base line is established, and stakes are planted along it just where each of the first row of trees will stand, one person (A) slips a finger through the ring at one end of the wire and another person (B) runs a small stick through the ring at the other end. (A) then puts his ring at the first stake in the base line, (B) steps to where he supposes the first tree of the second row will be and strikes a small segment of a circle upon the ground. Then (A) goes to the second stake in the first row and holds his end of the wire exactly to it. (B) describes another small segment of a circle from that stake, and where these two segments cross, a stake must be driven and this is the location of the first tree in the second row. Likewise these two operators may find the location of each tree in the second, third, fourth rows, etc., using each row in turn as a base line. Before doing any planting, the whole field should be measured and staked in the above way. If the work is done carefully the trees will be found to be in very straight rows in every way.

PLANTING THE TREE.

The ground should be smooth and in good tilth. Plowing along the line of tree rows may lessen the hand labor somewhat, and afford opportunity for surface drainage, but the holes must be dug by hand. The harder the ground, the wider and deeper the holes should be. In all cases they should be wide and deep enough to receive all the roots of the tree without it being necessary to crowd or twist them. If the bottom is hard, it should be picked until it is mellow, or some loose surface soil should be thrown in. Never throw coarse manure or sods into the bottom of the hole, hoping to furnish humus and fertility to the tree. While they are decomposing, they absorb moisture and cause heating, which is sure to injure the roots of the tree.

When the young tree is dug in the nursery, a portion of the root system is removed, some roots are broken and the ends of others are ragged or torn. These broken roots and ragged ends should be cut off smoothly so that the cut surface will lie upon the bottom of the hole. Then if there is an abundance of fine roots, especially under the crown, they should be thinned out. If the trees are heeled-in in the fall, this root pruning may be done then and by spring the cut surface will have calloused over, though usually the roots are pruned just before planting.

If a stake has been placed to indicate the proper location of each tree, this location will be lost when the stake is pulled and the hole dug, unless a planting-board is used. This is a thin board 3 to 4 inches wide and 4 to 6 feet long, with a notch at its center and at each end. Before digging the hole, the planting-board should be placed on the ground with the notch in the center against the stake. (See Plate 1.) Then a stake should be driven in the ground fitting in the notch at each end. The board should then be lifted, laid aside and the hole dug, the board is then returned to its place and the tree stood in the notch, the exact original location of the stake. This is an accurate method of placing the tree, but many consider it too slow to be practical in large fields. In large fields the sighting method is usually to be preferred.

For convenience and rapidity, two men can work together in planting the trees. One man should stand the tree in its proper place in the hole and carefully spread out the roots in their natural direction. Then the second man should throw in some loose, moist surface soil, a little at a time, so that it thoroughly covers the roots on all sides, underneath, as well as above, and especially under the crown of the tree. After this has been done, and the ground is tramped firmly, the hole may be filled and be tramped more rapidly. Finally, the soil should be left mellow at the top, so that it will not bake and permit much moisture to escape. When the hole is filled, the tree should stand about two inches lower in the ground than it did in the nursery, except with dwarf pears, which should be set from three to six inches below the bud of graft.

In the case of fall planting, the ground should be mounded up about the trunk of the tree, and so provide ample surface drainage. Trees planted on locations exposed to strong prevailing winds, should be

leaned toward the wind slightly, or else be supported by a strong stake. This avoids lopsided rows so often seen on exposed slopes.

PRUNING THE YOUNG TREES.

Since some of the roots are removed when the tree is dug from the nursery, and possibly some are pruned off before planting, the tops must be cut back to produce a balanced condition. This should be done immediately after planting. The practice of doing this pruning before the tree is set is not often satisfactory. In doing the pruning, the orchardist should aim to top the trees low, from 18 to 24 inches above the ground. When the trees are full grown, pruning, spraying, thinning and harvesting will be more convenient than if headed high.

Apples, plums, pears and sour cherries should be pruned so as to leave three to five main or scaffold limbs distributed up and down the trunk for from 12 to 15 inches to avoid bad crotches, and these should be as conveniently distributed as possible about the trunk so as not to make the tree lopsided or so that one limb will not grow above another and interfere with it. (Plate 2, Figs. 1 and 2.) These small branches should be cut back to from 2 to 6 buds, the cut being made just above a bud. Yearling peaches and sweet cherries should usually be pruned back to a whip. (Plate 2, Figs. 3 and 4.)

The pruning for the first four or five years should be very carefully and systematically done so that the young tree may produce a strong symmetrical open top. Each spring the main limbs should be cut back to make them grow stocky and strong. At the same time all undesirable branches should be cut out and the rest shaped so that the top will be open, admitting free circulation of air and sunlight.

Since different varieties of fruits have different natural habits of growth, these habits should be taken into consideration. Those naturally growing compact heads may be pruned so that the branches will grow outward while those with tops naturally open, need not be pruned so severely.

In all cases make smooth, clean cuts, and as close to the trunk limbs or buds as possible, but not so close as to injure the trunk or bud.

AFTER-CARE OF THE ORCHARD.

It is very essential that the young trees be kept in the best possible condition of thrift and health, hence it is necessary to conserve all the moisture and plant food in the soil. To do this cultivate thoroughly, and systematically. Different soils and different conditions will alter the methods used. Early in the spring, as soon as the condition of the soil will permit, plow 6 or 8 inches deep. If the trees have been planted as deeply as they should be, this deep plowing will cause them to pro-

duce deep root systems not so apt to be injured by freezing or drought. After this the soil should be frequently stirred to produce a shallow soil mulch and prevent baking or crusting of the surface and the consequent heavy loss of moisture by evaporation. The cultivation will also kill all weeds which are drains upon the soil moisture and available plant food. It also liberates the plant food and assists in decomposing any or all plant food that may be turned under.

About the first of August, cultivation should be stopped so that the trees will have an opportunity to mature and harden the season's growth and buds and prepare them for winter. At the last cultivation some plant, to serve as a cover crop, should be sown. This will absorb and conserve much available plant food that would otherwise be lost. It also prevents washing of the soil, holds the leaves and snow during the winter, and in the spring, when turned under, furnishes a considerable quantity of humus to the soil. If the soil is in need of nitrogen, such plants as clovers, vetches, peas, etc., should be used, otherwise, oats, barley or buckwheat. If it is desirable, hoed crops, such as corn, potatoes or beans may be raised among the trees. The cultivation necessary for them will usually suffice for the trees. They should not be planted nearer than 3 or 4 feet from the ends of the branches, however, and greater care will need to be taken to maintain the fertility of the soil. Grain crops, such as wheat, rye or oats, should never be raised among the fruit trees, as they are heavy users of moisture and plant food. A clover sod may be grown between the rows, if sufficient space is left along the rows to cultivate. On the steep side of hills, or rocky fields, which should be avoided if possible, sod or straw mulches may be substituted for cultivation. Such a method, however, encourages surface root systems that are liable to injury in winter or drouths.

In cultivation, care should be taken to cover the ends of the whiffletrees with leather or rubber, and high hames or other projections on the harness should be discarded to avoid barking the trunks and limbs of the trees. A muzzle upon the horse's nose will avoid many nipped limbs.

In addition to the cultivation, the trees need to be fed to make them thrifty. There is nothing better for this than barnyard manure, if applied late in winter and also in the spring, so that the trees get the benefit early in the season. Two or three handfuls of nitrate of soda incorporated into the soil about the tree, but not in contact with the roots, several times in the season will be very beneficial. It is very quickly available and should be used with great care. Unleached hardwood ashes will furnish potash and lime that assist the tree in making a firm wood growth. Small quantities of phosphates will assist the trees in appropriating the other plant foods and help to mature the tree in the fall.

It is necessary, also, to keep the trees from from all injurious insects and diseases. Of the leaf-eating insects, there are the canker worms, cut worms, tent caterpillar, fall web worm, bud moth and tussock moth. These may be controlled by the use of some arsenical poison as arsenate of lead or Paris Green. Cut worms can usually be controlled by scattering two or three handfuls of a mixture of Paris Green and bran or Paris Green and finely cut clover leaves on the ground a few

inches from the trunk of the young trees. Curl leaf on peaches and leaf diseases on apples, pears, cherries, etc., can be controlled by the use of Bordeaux mixture. Examination should frequently be made of the trunks to destroy all borers. San Jose scale may be controlled by spraying with the lime-sulphur wash.

Care should be taken to remove all weeds, grass or other litter which might harbor mice. It is also frequently advantageous to wrap the tree trunks with wire netting, tar paper, or thin boards to protect them from mice or rabbits.

If a peach, apricot or plum tree develops yellows or little peach, immediately remove and destroy it.

THE SELECTION OF VARIETIES.

One of the most important and difficult problems that the fruit grower has to solve, is the selection of varieties for his orchard. The choice of varieties should depend upon three principal considerations, the personal preferences of the grower, the purposes of the orchard and the locality. Failure to regard any one of these points will eventually bring failure to the orchard.

The personal preferences of the grower are of much more importance than is generally given them. A man will usually take greater care and pains with his orchard and make it more successful if it contains varieties which he likes best. This is especially so in the case of the small home orchard. There are a number of varieties which are considered valuable, high quality apples, but all have a few favorite varieties and if these are adaptable to the locality and to the purpose intended, they should be the varieties chosen.

The second consideration, the purpose of the orchard or the nature of the market to be supplied, is one which has been greatly underestimated in scores of Michigan orchards, and points to one primary reason why so many of them are so badly neglected and unprofitable. If the orchard is to be a home orchard, it should contain varieties affording a succession of fruits for as large a part of the year as possible. They should all be of high quality, part suitable for dessert and part suitable for cooking. Size, appearance and productivity may wisely be sacrificed to some extent, although these are exceedingly desirable qualities and contribute much to the satisfaction that the fruits should give.

The commercial orchardist must be governed in his choice of varieties by the demands of the market which he expects to supply. If his market is a local and select one, the orchard should contain varieties that afford a succession and are prolific bearers of good sized, good quality, and in most cases, attractive appearing fruit. The commercial orchardist, who purposes to dispose of his fruit in the general market, has a problem of his own. He must understand that markets differ largely in their requirements; as for instance, many eastern cities prefer white peaches, while Chicago prefers a yellow peach, Boston craves for Baldwins, New York wants Greenings, Chicago is a large consumer of Damson plums,

Milwaukee covets prunes, etc. It must be acknowledged that many varieties which are not considered first-class and in some cases might be called inferior, can be disposed of to good advantage in almost all large general markets, because they are attractive to the eye on account of their size and color. This will always be true to a greater or less extent, still it is gratifying to realize that consumers are gradually cultivating their tastes for the better varieties even though they may lack slightly in size and may not be so attractive in color. While there will always be a market for varieties that are not considered standard, the market for the choicer varieties will surely increase and this is the market that will always give the best returns.

Varieties differ so largely in adaptability to different climatic and soil conditions, that the grower must be exceedingly careful in his selection. Some varieties can endure greater extremes of cold than others, some require special soils. There are a few varieties that do comparatively well in almost all parts of the state, but most of the better varieties are more or less sensitive to their surroundings and it does not necessarily follow that, because a variety does well in one part of the state it will do equally well in others, even of the same latitude.

Many varieties which are successful in the western Michigan fruit belt, are absolute failures in other parts of the state. So the prospective orchardist must make a careful investigation to determine what varieties do best in his particular locality and conclude which of these will do best on his particular site and soil. Failure to do this means failure for the orchard.

The commercial orchardist should confine himself to a few varieties. Experience has proven time and again that it is much easier to dispose of the crop from an orchard if it has only a few varieties than if the orchard has only a few trees of several varieties. Only in exceptional cases, would it be wise to plant more than four or five varieties in a commercial orchard and many times fewer would be better. The grower can also make a more careful study of the special requirements of each variety and be able to produce them to better advantage.

Some varieties have delicate skins and bruise easily and hence are poor shippers. If the fruit must be shipped long distances to market, such varieties should not be included in a list for a commercial orchard. However, this will depend largely upon the care with which the fruit is handled in harvesting and marketing. Varieties for cold storage uses should be those which have good keeping qualities.

VARIETIES SUGGESTED.

Apples for Home Orchard—Yellow Transparent, Sweet Bough, Pirmate, Jeffries, Duchess of Oldenburg, Chenango, Dyer, Maiden Blush, Wealthy, Shiawassee, McIntosh, Fameuse, Jacobs Sweet, Sutton, Hubbardston, King, Wagener, Winter Banana, Grimes Golden, Tolman, Jonathan, Northern Spy, Rhode Island Greening, Red Canada, Golden Russett, Aiken.

Apples for Market—Yellow Transparent, Duchess of Oldenburg, Gravenstein, Wealthy, McIntosh, Fameuse, Hubbardston, King, Wagener, Grimes, Jonathan, Spy, Baldwin, Rhode Island Greening, Red Canada.

Crab-apples for Home Use—Martha, Transcendant and Dartmouth.

Crab-apples for Market—Hyslop.

Pears for Home Use—Summer Doyenne, Bloodgood, Clapp's Favorite, Bartlett, Manning, Elizabeth, Seckel, Jones, Bosc, Sheldon, Anjou, Belle Lucrative, Duchess (Angouleme), Louise, Superfin, Dana's Hovey, Lawrence, Winter Nelis, Kieffer (for canning).

Pears for Market—Giffard, Bartlett, Seckel, Bosc, Clairgeau, Howell, Vermont Beauty, Anjou, Duchess (Angouleme), Kieffer.

Peaches for Home Use—Alexander, Dewey (or Wark), Early Michigan, Hale's Early, Crane's Yellow, Yellow St. John, Champion, Fitzgerald, Mountain Rose, Engle, New Prolific, Kalamazoo, Markham Chili, Gold Drop, Lemon Free, Banner, Salway.

Peaches for Market—Dewey or Wark, Early Michigan, Davidson, St. Johns, Early Crawford, Weed's Barnard, Engle's Mammoth, Kalamazoo, Crosby, New Prolific, Improved Chili, Elberta, Gold Drop, Lemon Free, Banner, Salway.

Plums for Home Use—Red June, Czar, Abundance, Jefferson, Bradshaw, Lombard, McLaughlin, French Damson, Fellenberg or Italian Prune, Monarch, Bavay's Green Gage (Reine Claude), Coe's Golden, Stanton.

Plums for Market—Japan: Red June, Burbank, October Purple. European: Bradshaw, Lombard, Black Diamond, Arch Duke, Pringle Damson, Shropshire, Grand Duke, Fellenberg, Monarch, Coe's Golden, Bavay, Copper.

Cherries for Home Use—Sour: Early Richmond, Montmorency. Sweet: Gov. Wood, May Duke, Tartarian, Yellow Spanish, Bing, Windsor.

Cherries for Market—Sour: Early Richmond, May Duke, Montmorency, Dukes, English Morello. Sweet: Gov. Wood, Napoleon, Yellow Spanish Tartarian, Bing, Windsor, Smith's Bigarreau.

Quinces—Orange, Rea Mammoth, Missouri Mammoth, Champion.

DESCRIPTION OF TREE AND FRUIT, OF PRINCIPAL VARIETIES SUGGESTED.
ORDER OF HARVESTING:

Yellow Transparent—Tree of medium size, hardy, moderately vigorous, upright (compact), bears 4-6 years of age and prolifically. Should be thinned heavily to produce annual crops. Fruit—Season, late July

and August; medium size, good quality, excellent for cooking, has tender yellow skin, bruises easily and cannot be shipped long distances.

Sweet Bough—Tree medium to large, hardy, vigorous, upright, spreading, bears early and prolifically, subject to canker. Fruit—Season, late July; large, excellent quality, good for dessert, cooking or local market, somewhat subject to scab.

Primate—Tree large, hardy, moderately vigorous, upright, spreading, bears 5-7 years of age, productive, somewhat subject to canker. Fruit—Season, ripens unevenly, August and September; medium to large, quality very good, juicy, excellent for dessert, somewhat subject to scab.

Oldenburg (Duchess of Oldenburg)—Tree medium size, vary hardy, moderately vigorous, bears at 4-6 years, yielding heavy crops biennially; sometimes subject to collar rot. Fruit—Season, ripens unevenly through late August and September, large size, excellent for cooking or market. Free from scab.

Maiden Blush—Tree medium size, hardy, vigorous, upright, spreading, bears early and usually every year. Fruit—Season, September and early October; medium to large, attractive, good for dessert, cooking or market, has tender skin and must be handled carefully, very subject to scab.

Gravenstein—Tree large, hardy, vigorous, upright, spreading, bears moderately early and fairly well every second year, occasionally subject to canker. Fruit ripens unevenly, during late September until November, medium to large, good for cooking or market.

Wealthy—Tree medium size, hardy, moderately vigorous, upright, spreading, bears 4-6 years, very productive, requires heavy thinning. Fruit—ripens late September or early October, medium to large, good for dessert, cooking or market, very free from scab, drops badly.

McIntosh—Tree medium to large, hardy, vigorous, upright, spreading, bears 5-7 years and heavily every other year. Fruit ripens in October, medium to large in size, very attractive, excellent for dessert, cooking or market; flesh is tender and bruises easily and it cannot be shipped long distances, very subject to scab.

Fameuse (Snow)—Tree medium to large, hardy, vigorous, upright, spreading, bears 5-7 years, annually and prolifically. Fruit ripens in October, medium in size, attractive, extra for dessert, cooking or nearby market. Very subject to scab.

Hubbardston—Tree medium to large, fairly hardy, vigorous, upright, spreading, bears 5-6 years of age, very productive, requires heavy thinning. Sometimes subject to canker. Fruit ripens fore part of October, medium to very large, generally good for dessert, cooking or market until January. Smooth, very free from scab.

King—Tree large, vigorous, hardy, upright spreading, bears 6-8 years, generally not very productive, is subject to canker and collar rot. Fruit ripens fore part of October, large, attractive, extra fine for dessert, cooking and market, not very subject to scab, drops badly.

Wagener—Tree medium in size, hardy, moderately vigorous, upright spreading, bears 4-5 years, and so abundantly that it requires heavy thinning, especially while young to prevent stunting of tree. Fruit ripens in October, medium to large, attractive, excellent for dessert, cooking or market.

Grimes Golden—Tree medium to large, hardy, vigorous, upright spread-

ing, bears 5-7 years, very productive, usually requires thinning to secure good size. Fruit ripens in fore part of October, excellent for dessert or cooking and sells well in markets where its quality is known. Somewhat subject to scab.

Jonathan—Tree medium to large, hardy, vigorous, upright spreading, bears 4-5 years, very productive and requires thinning. Should be planted on strong soil to get good sized fruit. Somewhat subject to collar rot. Fruit ripens in October, attractive, extra fine for dessert, culinary use or market. Very free from scab.

Northern Spy—Tree very large, should be planted 40-50 feet apart, very vigorous, upright, thick, spreading, seldom bears before 12 to 15 years of age, very productive as it grows older. Fruit ripens in October, large to very large, attractive, extra fine for dessert, culinary use or market. Quite subject to scab.

Baldwin—Tree large, hardy, vigorous, upright, spreading, seldom bears until 10-12 years of age, but then usually becomes very prolific bearer. Somewhat subject to canker. Fruit ripens about middle of October, medium to large, attractive, excellent for dessert, culinary use and market.

Rhode Island Greening—Tree large, hardy, vigorous, wide-spreading, drooping, dense, bears 8-10 years of age, and prolifically. Fruit ripens about middle of October, medium to very large, excellent for dessert, culinary use or market. Somewhat subject to scab.

Red Canada—Tree medium to large, lacks slightly in hardness, vigorous, upright, dense, spreading, seldom bears before 10-12 years, often a shy bearer, seems to do especially well in southeastern counties of Michigan. Fruit ripens late October, medium to large, attractive, good for dessert, culinary or market use. Is an especially good keeper.

Winter Banana—Tree medium in size, hardy, vigorous, rather flat, spreading, bears 6-8 years and then is fairly productive. Fruit ripens early October, large to very large, attractive, much esteemed for dessert and culinary use, but shows bruises so badly that it is not prized highly as a commercial variety. Somewhat subject to scab.

Sutton (Sutton's Beauty)—Tree medium in size, hardy, vigorous, very upright, compact, bears 6-8 years, fairly productive. Fruit ripens middle of October, medium to large, very attractive, excellent for dessert, culinary or high class market. Somewhat subject to scab.

PEARS.

Giffard—Hardy and very productive, fruit medium size, juicy and melting, ripens middle of August, best of its season.

Bartlett—Tree large, hardy, vigorous, very productive, but very subject to "fire blight." Fruit large, tender, buttery, excellent for dessert, cooking or market. Ripens early September.

Seckel—Tree large, hardy, moderately vigorous, erect grower, very productive, very free from blight, requires high cultivation. Fruit small, fine-grained, very sweet, juicy and buttery. The standard of excellence among pears. Ripens late September or early October.

Bosc—Tree medium to large, hardy, vigorous and very productive, has crooked trunk and requires top working on some other stock. Flemish Beauty has proved very good. Fruit medium to large, russet, juicy,

buttery, rich and sweet, excellent for dessert, cooking or market. Ripens October.

Duchess (Angouleme)—Tree medium to large, hardy, vigorous and very productive, does best when grown on quince stock. Fruit very large, melting, buttery, juicy, valuable for dessert, cooking or market. Ripens October.

Clairgeau—Tree medium, hardy, moderately vigorous, erect, moderately productive. Somewhat subject to blight. Fruit ripens large, somewhat granular, buttery, melting, often with rich flavor, but frequently poor, good for market. Ripens late October.

Howell—Tree medium size, hardy, vigorous, erect and very productive. Fruit medium to large, yellow, melting, buttery, moderately rich, usually good quality, good for dessert, cooking or market. Ripens late October.

Anjou—Tree large, very hardy, vigorous, upright spreading, very productive. Seldom bears before 10 years old. Fruit large, fine-grained, buttery, melting, with rich flavor, one of the most valuable dessert and market pears. Ripens, October.

Kieffer—Tree medium to large, very hardy, very vigorous, upright, dense, slightly spreading, usually very productive. In some places requires interplanting of some other variety. Bartlett or Lawrence are suggested. Fruit large to very large, poor quality, but a favorite of growers and canners. Ripens late October or early November.

PEACHES.

Dewey—Tree medium in size, hardy, vigorous, productive and requires heavy thinning. Fruit medium to large, yellow, nearly freestone, fair quality, ripens in August, good for early market. Somewhat subject to rot.

Wark—Tree medium in size, hardy, vigorous, productive. Fruit medium in size, yellow, clingstone, good quality, ripens in August. Good for early market.

Davidson—Tree medium in size, hardy, vigorous, very productive. Requires heavy thinning. Fruit medium to large, smooth skin, yellow, freestone, follows shortly after Dewey, good for dessert or market.

Early Michigan—Tree medium in size, hardy, vigorous, very productive. Requires careful thinning. Fruit medium to large, white, freestone, ripens about same time as Dewey, good for dessert or local market. Is very subject to rot.

St. Johns—Tree medium in size, somewhat tender in bud, vigorous, very productive in favorable years. Fruit medium to large, yellow, freestone, ripens about same time as Early Michigan, quality very good, good for dessert, culinary or market use, ripens about same time as Early Michigan.

Early Crawford—Tree large, tender in bud, very vigorous, requires severe heading in, fairly productive in favorable years. Fruit medium to large, yellow, freestone, good for dessert, culinary use or market. About two weeks later than St. Johns.

Engles Mammoth—Tree medium to large, hardy, very vigorous, productive. Fruit medium to large, attractive, yellow, freestone, valuable for dessert, culinary use or for market, ripens in September.

Kalamazoo—Tree large, hardy, very vigorous, productive. Fruit

medium size, yellow, freestone, very good for dessert, culinary use or market, follows Engles very closely.

Crosby—Tree medium to large, hardy, vigorous, very productive, requires heavy thinning. Fruit inclined to be small unless thinned severely, yellow, freestone, very good for dessert, culinary or market use. Ripens about same time as Kalamazoo.

Elberta—Tree large, hardy, very vigorous, very productive. Fruit large, uniform in size and shape, yellow, highly colored, freestone, one of the most valuable market varieties, ripens shortly after Kalamazoo. Very subject to curl leaf.

New Prolific—Tree large, hardy, vigorous and very productive. Fruit large, yellow, smooth, freestone, valuable for dessert, culinary or market. Ripens with Elberta.

Gold Drop—Tree medium in size, hardy, vigorous, and very productive. Requires severe thinning to secure size in fruit. Fruit small to medium, yellow, freestone, unsurpassed for dessert or culinary use, but most too small for good market variety. Drops badly and is subject to scab.

Lemon Free—Tree medium size, moderately vigorous, hardy, very productive. Fruit medium to large, yellow, freestone, good variety for dessert, culinary or late market, ripens October, too late for northern counties.

Banner—Tree medium in size, hardy, vigorous, productive, requires thinning. Fruit has tendency to run small, yellow, freestone, good for dessert, culinary or market use, ripens with Lemon Free, too late for northern counties. Drops badly.

Salway—Tree large, hardy, vigorous, productive. Fruit medium, yellow, freestone, good for dessert, culinary or late market in southern counties. Very subject to scab.

PLUMS.

Red June—Tree medium size, upright, moderately vigorous, fairly hardy, productive. Fruit medium, red, firm flesh, good for dessert or early market use. Ripens early in August.

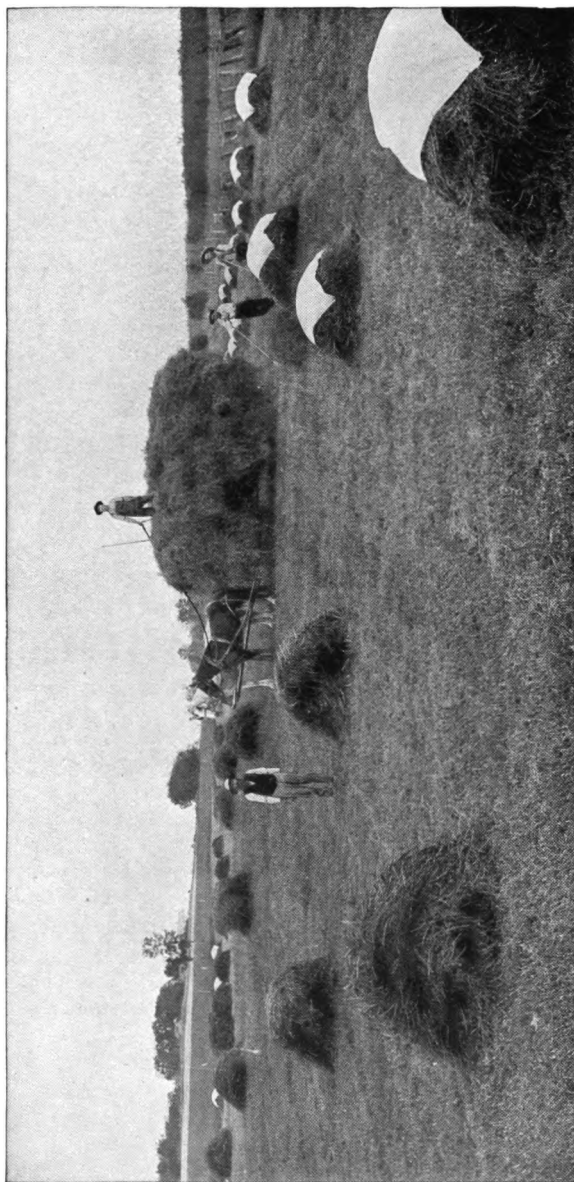
Burbank—Tree large, flat spreading, vigorous, hardy, very productive. Fruit medium to very large, dark red, or purplish, firm juicy flesh, fair for dessert or culinary purposes and sell well in some markets. Ripens last part of August and early September. Very subject to brown rot.

October Purple—Tree large, upright, spreading, hardy, very vigorous, very productive. Fruit medium to large, reddish-purple, firm, juicy, ripens about October 1st, good for late market.

Bradshaw—Tree large, upright, spreading, hardy, very vigorous, very productive. Fruit large, purple, firm, juicy, good for dessert, culinary or market use, ripens in August.

Lombard—Tree large, upright, spreading, hardy, vigorous, very productive, does well in all parts of Michigan. Fruit medium size, violet red, juicy, highly prized for home use and valuable for local market, ripens early in September. Very subject to rot.

Black Diamond—Tree large, upright, spreading, hardy, vigorous, very productive. Fruit large, blue, firm, *excellent* for market purposes, ripens early in September.



**Alfalfa Cuts from Three to Five Tons to the Acre. O. F. Marvin, Muskegon County.
Courtesy of the West Michigan Development Bureau.**

Arch Duke—Tree large, spreading, dense, fairly hardy, vigorous and productive. Fruit large blue, freestone, firm flesh, good for market, ripens fore part of September, drops badly.

Shropshire Damson—Tree medium in size, upright, dense, hardy, vigorous, productive every second year. Fruit small, blue, firm, good for culinary and market use, ripens about middle of September.

Grand Duke—Tree medium to large, upright, spreading, moderately hardy, vigorous, very productive. Fruit large, blue, firm flesh, good for late market, ripens last of September, rots very badly under favorable conditions.

Fellenberg—Tree medium in size, flat, spreading, hardy, vigorous, productive. Fruit medium size, blue, firm flesh, freestone, excellent for dessert, culinary or market use, very subject to attacks of curculio, ripens middle to latter part of September.

Monarch—Tree large, upright, spreading, moderately hardy, vigorous, very productive. Fruit medium to large, blue, firm, freestone, excellent for dessert, culinary or market use, ripens late October. Somewhat subject to rot.

Coes Golden—Tree above medium to large, flat, spreading, moderately hardy, vigorous, productive. Fruit large, yellow, firm, juicy, sweet, excellent for dessert or culinary use, and sells well where known, ripens late September or early October.

Bovay—Tree medium size, upright, spreading to roundish, rather tender, moderately vigorous, very productive. Fruit medium size, greenish-yellow, firm, juicy, sweet, excellent for dessert and especially for culinary purposes, ripens late September or early October.

Copper—Tree medium upright, slightly spreading, hardy, moderately vigorous, productive. Fruit small, purple, firm, juicy, good for very late market, ripens middle of October or later.

SOUR CHERRIES.

Early Richmond—Tree medium size, spreading, hardy, vigorous, regular and prolific bearer. Fruit medium size, bright red, juicy, best early sour cherry for culinary or market use, ripens from middle of June until in July.

May Duke—Tree medium size, spreading, hardy, vigorous, productive. Fruit large, dark red, juicy, rich subacid, valuable for culinary or market use, ripens late June or early July.

Montmorency—Tree large, spreading, hardy, very vigorous, regular and profuse bearer. Fruit large, crimson red, juicy, most valuable sour cherry for market or culinary use, ripens July.

English Morello—Tree medium size, low spreading, hardy, moderately vigorous, prolific bearer, very subject to cherry leaf spot disease. Fruit large, very dark red to black, juicy, very sour, valuable late variety, ripens last of July and early August.

SWEET CHERRIES.

Gov. Wood—Tree large, upright, spreading, hardy, vigorous and very productive. Fruit large, light yellow, tender, juicy, good for dessert or

canning, but does not ship well. Somewhat subject to rot. Ripens irregularly latter part of June to early July.

Napoleon—Tree large, spreading, hardy, vigorous and very productive. Fruit large, pale yellow, firm, juicy, sweet, good for dessert or canning purposes or local market, shows bruises too badly to ship well, ripens in July.

Black Tartarian—Tree medium, upright, slightly spreading, hardy, vigorous, very productive. Fruit large, black, tender, juicy, mild, sweet, one of the most valuable varieties for dessert, culinary or market use, ripens early to latter part of July.

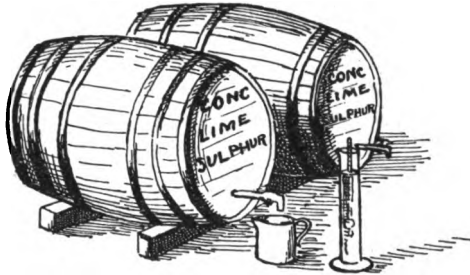
Yellow Spanish—Tree medium to large, spreading, hardy, vigorous, productive. Fruit large, pale yellow, firm, juicy, good for dessert or canning purposes or local market, ripens latter part of June to early July.

Bing—Tree medium to large, upright, spreading, hardy, vigorous, very productive. Fruit very large, black, firm, juicy, very valuable for dessert, culinary or market purposes, ripens about middle of July. Very subject to rot.

Smith's Bigarreau—Tree very large, upright, spreading, very hardy and vigorous, moderately productive. Fruit very large, black, firm, juicy, very choice for dessert, culinary or market uses, ripens latter part of July. Somewhat subject to rot.

Windsor—Tree very large, upright, spreading, hardy, vigorous, is difficult to get started, very productive. Fruit large, black, firm, juicy, valuable variety for dessert, culinary or market purposes, ripens latter part of July. Very subject to rot.

SPRAY AND PRACTICE OUTLINE FOR FRUIT GROWERS, 1912.



(Reprinted from Special Bulletin 57.)

BY H. J. EUSTACE AND R. H. PETTIT.

GENERAL TREATMENT FOR APPLE ORCHARDS.

In the winter or early spring, inspect the trees for San Jose, scurfy or oyster-shell scale. (Send twigs and strips of bark to the Experiment Station, if you cannot identify the scale yourself.)

These scales, especially the San Jose scale, must be destroyed promptly or they will kill the trees.

JUST BEFORE THE BUDS OPEN, if the scale be present, spray with the *strong* lime-sulphur wash. To be successful, the work must be done very thoroughly—this means that *every part* of the tree must be covered with the spray.

JUST BEFORE THE BLOSSOMS OPEN, OR WHEN THEY ARE "IN THE PINK," a spraying must be made to prevent scab and other fungus disease and the canker-worm, bud-moth and a few other insects. For this and the sprayings that follow, use the dilute lime-sulphur or the bordeaux mixture. To every fifty gallons, add two or three lbs. of arsenate of lead. (With lime-sulphur, this is the only poison that can be used.)

AFTER THE BLOSSOMS FALL AND THE STAMENS WITHER, and before the calyx closes, another spraying must be made just like the one before. At this time direct the spray downward from above as much as possible, and with the highest pressure available, the object being to get some of the material into the calyx cups, to poison the codling moth when it appears and attempts to enter.

Cut open a calyx cup occasionally, if the spray has not been driven inside you are not doing a thorough job.

This is a very necessary spraying. If well done it usually means a good crop free from worms.

ABOUT TWO WEEKS AFTER THE ABOVE SPRAYING, make another. Use same mixture and poison as in previous spraying.

LATE IN JULY OR EARLY IN AUGUST, there will be a second generation of codling-moths. Just when this will occur for your locality can be determined. (See "When the codling-moth flies" page 177.)

Protect fall and winter varieties against the codling-moth and a possible late outbreak of scab. Use the usual amount of poison, but the *dilute* lime-sulphur, or the bordeaux which can be made somewhat weaker than before.

The lesser apple-worm, which works more superficially than the codling-moth, when present requires a spray of poison when standard winter varieties are from 1 to 1½ inches in diameter.

GENERAL TREATMENT FOR PEACHES.

Inspect for scale insects, the same as for apple and spray with *strong* lime-sulphur wash the same as directed for apple trees.

If this spraying is made, it will also prevent the leaf-curl disease. If the lime-sulphur spraying is not required, a spraying must be made to prevent the leaf curl which is often especially serious on Elbertas. For this spraying, use bordeaux mixture or the copper sulphate solution (2 pounds of copper sulphate dissolved in fifty gallons of water). It is very important that this spraying be made *before* the buds swell. If made after that time, it will not be successful in preventing the leaf curl.

If the fruit in your orchard is commonly affected with the rot and the scab (the small black specks usually on the upperside) and the curculio ("the insect that stings the fruit")—and most of the peach orchards in Michigan are affected with all of these—make sprayings as follows:

JUST AFTER THE BLOSSOMS DROP AND MOST OF THE "SHUCKS" HAVE FALLEN OFF, spray with poison using 2 pounds of arsenate of lead in every 50 gallons of water.

Never use any arsenical other than arsenate of lead, on peach.

TWO WEEKS AFTER THE PREVIOUS SPRAYING, another must be made. This time use the self-boiled lime-sulphur and to every 50 gallons add 2 pounds of arsenate of lead. The *dilute* lime-sulphur has not been generally satisfactory on peaches. Even when very *dilute* some burning of the foliage has resulted.

ABOUT ONE MONTH BEFORE THE FRUIT RIPENS, spray again and the same as directed above.

In orchards where the curculio is not present or not serious, the spraying recommended "Just after the blossoms fall" can be omitted.

Self-boiled lime-sulphur settles rapidly, so keep well agitated and do not add the arsenate of lead until just before spraying. Use fine nozzles and give the trees a uniform coating of a mist-like spray.

PEACH TREE BORER. Dig out by hand early in spring or late in fall at points where gumming shows. Sterilize knife with carbolic acid to prevent spreading crown gall which may be present.

"PEACH YELLOWS" AND "LITTLE PEACH."

These two diseases are extremely contagious and very difficult to positively identify. Their causes are unknown and the only method of control is destruction of the tree—fruit, root and branch—as soon as discovered. It is especially important that diseased trees should not

be allowed to blossom as it is believed the disease is spread by insects at that time. Both old and young trees of all varieties of peaches and probably all varieties of Japanese plums are susceptible to the two diseases. Both diseases may be present in a tree at the same time.

PEACH YELLOWS. The first symptoms in a young tree, previous to bearing, are indicated by the leaves of one or two limbs turning from a rich dark green to a "yellowish green or reddish rusty green" color; this is accompanied by a rolling of the leaves from their edges. These leaves ripen and fall earlier than normal leaves. The fruit buds are larger and more mature in appearance and in the spring will invariably bloom earlier than healthy buds. In some instances, the symptoms are not confined to one or two branches, but many of the leaves in the center of the tree turn yellowish or light green, roll slightly from their edges and droop considerably. These latter symptoms are often present in cases of "Little Peach."

Upon bearing trees, there may be any one or all of the following symptoms: the fruit may ripen prematurely—one to three weeks—upon one or two branches or over the entire tree. The fruit may have numerous red spots on the surface, the spots sometimes extending in red streaks partially or wholly through the flesh to the pit. Often the flesh, about the pit, is full of radiating streaks of red. The surface of the fruit may be smooth or considerably roughened and the flesh more or less stringy and very insipid. The leaves may be yellowish pale or reddish rusty green in color, usually rolling and drooping. In advanced stages, numerous finely branched shoots bearing many slender sickly leaves, appear on the trunk or main limbs and sometimes in the extremities of the branches. *Finally the tree dies.*

Winter injury to the bark of the trunk or main limbs, mechanical injury by mice, rabbits, peach borers, cultivators, etc., or a serious lack of moisture or nitrogen in the soil may discolor the foliage and cause premature ripening of fruit and should not be mistaken for "Yellows."

LITTLE PEACH. In "Little Peach," characteristic symptoms are: the leaves of a part or the whole of the tree have a bunched appearance, and are shorter, and broader than normal leaves. They are usually yellowish-green in color with the veins appearing dilated and darker than the intervening tissue. The fruit is usually under size and ripens from a week to two weeks late. The flesh is more or less stringy, watery and very insipid while the pit is usually very small. One or all symptoms may be present and unless they can be positively attributed to some other cause, the tree should be condemned, pulled out and burned.

GENERAL TREATMENT FOR PEARS.

Inspect for scale insects and if present, spray before the buds start with *strong lime-sulphur*. The *Pear Blister Mite* (a mite that causes thickened red and brown spots on the leaves) and the *Pear Psylla* may also be partially controlled by this spraying for scale. If these pests were serious last year, make the strong lime-sulphur spraying even if not needed for the San Jose scale.

APPLY THE SAME GENERAL TREATMENT TO PEARS as is given for apples.

If the *dilute* lime-sulphur is used, it should not be as strong as for apples (see dilution table on last page).

Pear Blight or Fire Blight was very serious last season in many parts of the state. It is easily noticed, a branch dies back from the tip, leaves turn brown, wither but do not drop. Is caused by a germ that works within the twig and hence spraying is not a preventative. It usually is more serious in rapidly growing trees and for this reason, many pear orchards are left in sod. Cut out the diseased twigs and branches. Make a frequent and systematic inspection of every tree and cut out every diseased twig and branch found. Cut several inches below where the wood appears to be dead. Carry the dead portion out of the orchard and bury or burn. After every cut, wipe off the wound with a cloth or sponge moistened with a 5% carbolic acid solution.

If slugs appear, spray with an arsenical, if not too near ripening of fruit to be dangerous. In case of early pears *fresh* hydrated lime may be dusted on.

GENERAL TREATMENT FOR PLUMS.

Plum trees may be infested with the San Jose and European fruit scale. The treatment for them is the same as recommended for scale on apples. (Page 1.)

JUST BEFORE THE BUDS SWELL, spray with the *dilute* lime sulphur (or the bordeaux mixture) and arsenate of lead, $2\frac{1}{2}$ to 3 lbs. to a barrel. This is to prevent leaf-spot, fruit rot, black knot and curculio.

Arsenate of lead is preferable to paris-green on all stone fruits, owing to tenderness of foliage in such fruits.

IMMEDIATELY AFTER THE BLOSSOMS FALL, it is very essential to make another spraying using the *dilute* lime-sulphur or bordeaux mixture or *self-boiled* lime-sulphur and two pounds of arsenate of lead to every 50 gallons. (For the Japanese varieties use the self-boiled lime-sulphur or dilute the bordeaux one-half.) This spraying is to prevent the leaf trouble, fruit rot and curculio, be sure it is made *immediately* after blossoms fall. Our experiments last year showed that dilute lime-sulphur was very satisfactory on plums and it is easier to prepare and spray than bordeaux or *self-boiled* lime-sulphur.

TEN DAYS OR TWO WEEKS LATER, it will pay to repeat the previous spraying, especially if the weather is wet or the curculio is serious. This spraying should be repeated every ten days or two weeks until there is danger of staining the fruit; stopping at least a month before picking time.

On varieties especially susceptible to rot, an application of weak copper sulphate may be made about two weeks before ripening. One pound of copper sulphate to 150-200 gallons of water. No poison need be used.

BLACK KNOT. Early in the spring a careful inspection should be made of every tree, and *all* "black knots" cut out and destroyed. Cut back several inches below the knot. Disinfecting cuts as for pear blight is not necessary. Wild cherry trees harbor the disease and if diseased ones are near plum or cherry orchards, they should be destroyed, if possible.

GENERAL TREATMENT FOR CHERRIES.

Cherry trees may be infested with San Jose scale. If found, the treatment is the same as that recommended for the apple.

JUST BEFORE THE BLOSSOMS OPEN, spray with dilute lime-sulphur, self-boiled lime-sulphur or bordeaux mixture. This is to prevent the rot and leaf spot troubles. Especially valuable on the English Morellos for the latter. Our experiments last season indicate that the dilute lime-sulphur is just as satisfactory as the bordeaux or self-boiled lime-sulphur for cherries.

JUST AFTER THE BLOSSOMS FALL, make a spraying like the above with the addition of 2 pounds of arsenate of lead to every 50 gallons of spray solution. This spraying is directed against the rot and leaf spot, curculio and slug.

TEN DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the previous one for the rot and leaf spot. The need for this spraying will depend upon the susceptibility of the variety to the rot and the weather conditions of the season.

LARGE BLACK LICE may appear on the leaves at any time. A spraying of tobacco water (see page 16) will destroy them if applied before the leaves curl too tightly.

SLUGS sometimes appear after the fruit is harvested, a spraying of arsenate of lead (2 or 3 pounds in 50 gallons of water) will destroy them.

GENERAL TREATMENT FOR GRAPES.

Grape vines are not often subject to attacks by scale insects so there is seldom need for a spraying with *strong* lime-sulphur before growth starts.

Do not use the *dilute* lime-sulphur at any time for grape spraying. It stunts or checks the growth of the berries. Use the bordeaux mixture.

Grape black-rot has become a serious disease in the grape growing regions of Michigan. Last year, it was not as serious as during several years before. But growers who left a row unsprayed last year, found enough rotten fruit to convince them that the spraying was necessary and more than paid all the expenses connected with the work.

WHEN THE SHOOTS ARE ABOUT 8 TO 10 INCHES LONG, spray with bordeaux mixture for black rot.

JUST BEFORE BLOOMING, spray again with bordeaux mixture for black rot and to every 50 gallons of the bordeaux, add 2 or 3 pounds of arsenate of lead to poison the grape berry moth and the rose-chaffer. If this latter is serious use stronger poison even up to 5 lbs. to 50 gallons. A pint of the cheapest molasses added may help.

JUST AS THE BLOSSOMS ARE FALLING, make another spraying like the above.

ABOUT 10 DAYS OR TWO WEEKS LATER, it may be necessary to make another spraying like the two previous, but this will depend upon the weather conditions and the amount of rot prevalent. If later sprayings are thought to be necessary, some material should be used that will

not stain the fruit such as weak copper sulphate solution. (See page 173.)

There are several grape insects that are found only in occasional vineyards and then not every year. The grower should keep a sharp watch of his vines for them and if found, take prompt measures to destroy them. (If not familiar with their appearance send specimens to The Entomologist, East Lansing, Michigan.)

Those most likely to be found are the following:

FLEA-BEETLES may appear at any time but are most likely to come as the buds open in early spring. Spray with bordeaux mixture and a strong poison, 3 or 4 pounds of arsenate of lead to every fifty gallons of the bordeaux; if early in spring. Later use less poison.

In vineyards where the grape-berry moth is serious, spray with bordeaux and an arsenical poison during the middle of July, before the 20th.

For leaf-hoppers, sometimes incorrectly called "Thrip," spray with nicotine or with kerosene-emulsion while the insects are young, and before they can fly. Later in the fall, clean up all rubbish and burn after cold weather sets in.

For climbing cut-worms, use cotton bands or bands of sticky mixture. On tender growth these can be put on strips of paper.

GENERAL TREATMENT FOR CURRANTS AND GOOSEBERRIES.

San Jose and European fruit scale are often found upon these bushes. Inspect carefully for them. If found, spray before growth starts with *strong* lime-sulphur.

JUST AS THE LEAVES ARE EXPANDING, spray with *dilute* lime-sulphur or bordeaux and two pounds of arsenate of lead to every fifty gallons.

REPEAT this spraying when the fruit is about one-fourth grown.

If worms trouble after this, use pyrethrum or hellebore.

Leaf bugs or aphids may appear. When they do, spray with nicotine or strong tobacco water while the bugs are red and wingless and before the leaves have become curled.

GOOSEBERRY MILDEW is a fungus disease that is especially troublesome on the English varieties as Industry, Columbus and Chautauqua. Spray with dilute lime-sulphur. Begin when the buds start and repeat every 10 days or 2 weeks until near picking time.

WHEN PRUNING, if a cane is cut that shows discolored pith, it may indicate the cane borer. Cut back to sound pith. Burn trimmings.

WILTED FOLIAGE at any time indicates the cane borer. Cut out and burn.

GENERAL TREATMENT FOR RASPBERRIES, BLACKBERRIES AND DEWBERRIES.

ORANGE RUST may appear in May or June. It is easily identified by the bright orange color on the under side of the leaves. There is no method of preventing this trouble. As soon as it is found, the bush should be dug out and burned. If allowed to remain the disease will spread and destroy many plants.

ANTHRACNOSE, identified by the grayish spots on the canes (also on leaves but not conspicuous), is common in many berry fields. It does not yield to spraying unless very frequently done with bordeaux mixture and this may not be profitable. If desirable, make the first spraying when the new canes are 6 to 8 inches high and repeat every two weeks during the growing season.

Cutting out and burning the old canes immediately after fruiting will be of some benefit. In starting a new field, make a special effort to secure healthy plants.

"WORMS" or "SLUGS" might appear at any time. Spray with an arsenical if early in season, but if near picking time, use hellebore or pyrethrum.

Cut out and burn gouty galls, tree cricket eggs or borers in stems.

GENERAL TREATMENT FOR STRAWBERRIES.

Examine the young plants before setting them. Pick off all discolored or diseased leaves. If root lice are suspected, dip the roots in strong tobacco-water.

After the growth starts, spray with bordeaux and a poison to prevent the leaf spot and to destroy the leaf-roller insect that may be present.

For fruiting plantations, spray with bordeaux before blossoming and repeat ten days to two weeks later. After fruiting if the bed is to be fruited again, mow and burn over quickly (as on a day when there is a wind, to avoid burning the crowns of the plants). If leaf rollers have been present, spray with poison after the growth has started again but before the leaves curl.

For strawberry root lice, see Michigan Bulletin No. 244 page 88.

GENERAL TREATMENT FOR POTATOES.

FOR THE POTATO SCAB. Soak the uncut tubers for two hours in 30 gallons of water and one pint of formalin (can be secured of any druggist). This solution can be used several times. Do not put treated tubers back into crates or bags that held scabby potatoes. Make the treatment only a few days before planting if possible. Do not plant upon land that has recently grown crops of scabby potatoes or beets.

FOR THE BLIGHT AND "BUGS." Begin spraying with bordeaux mixture and poison when the "bugs" first appear, or when the plants are about 8 inches high, and repeat about every 2 weeks as long as the plants are growing. Spray often in warm, muggy weather; fewer sprayings are necessary in dry weather.

Use bordeaux mixture (6 pounds copper sulphate and 4 or 5 pounds of lime to 50 gallons of water, and put in the poison, about $\frac{1}{2}$ pound of Paris green or 2 pounds of arsenate of lead, or 1 quart of the stock solution of Kedzie mixture).

Dilute lime-sulphur will not do as a substitute for the bordeaux for potatoes.

PREPARATION OF SPRAY MIXTURES.

STRONG LIME-SULPHUR.

Strong lime-sulphur to be used on dormant trees or bushes for scale insects, can be prepared in three ways:

By the old formula,

By reducing with water "the home made" concentrated wash.

By reducing with water the "commercial" concentrated wash.

The "Old formula" has been used for many years with good results and is very satisfactory. The formula is as follows:

Lump lime	20 pounds.
Sulphur (flour)	15 pounds.
Water (hot) to make	50 gallons.

The lime is slaked with a small amount of water (hot if lime is sluggish) and the sulphur is added, fifteen or twenty gallons of water are then added, and the mixture boiled. (It should take three-quarters of an hour or an hour of good boiling with frequent stirring.) When done the liquid should be amber colored and fairly clear. Strain, dilute with water (hot is preferable) to make (up to) 50 gallons, and apply warm, through a coarse nozzle.

If small quantities are required, use an iron kettle to boil it in. If larger quantities are to be used, live steam is preferable for boiling purposes, either in a tank or in barrels.

Applied just before the buds swell, it coats the branches in such a way as partially to hinder from settling down, such pests as the oyster-shell, scurfy scale, some aphids, and other insects.

HOME MADE CONCENTRATED LIME-SULPHUR WASH.

Growers, having cooking plants, can make the lime-sulphur wash in a "concentrated" solution. This may be an economy of time, as large quantities can be made early in the season and stored until needed.

It is difficult to make this wash of uniform strength. For this reason, every batch that is made must be tested with a hydrometer and diluted accordingly.

The difficulty of getting a solution of uniform strength, apparently depends on the lime, which varies in composition and strength. Lime that contains more than five per cent of magnesium oxide and less than 90 per cent of calcium oxide does not combine in the cooking with the sulphur in a way to make a good mixture. Special "spraying lime" is now on the market.

There are several ways of combining the lime and sulphur, but always there are two parts, by weight, of sulphur to one of stone lime. The following three formulas are in common use:

Stone lime	75 lbs.	}	or	{	60 lbs.	}	or	{	40 lbs.
Sulphur	150 "				120 "				80 lbs.
Water	50 gal.				50 gal.				50 gal.

The lime is slaked to a thin paste and the sulphur is added. Boil for one hour and stir frequently. Water enough should be added so that there will be fifty gallons at the end of the boiling.

After it is cooked, if not to be used at once, it should be strained into a barrel which should be air tight, as exposure to the air causes the sulphur compounds to lose their value for spraying purposes. Each lot that is cooked should be tested with a hydrometer when cooled and diluted according to the dilution table when applied:

COMMERCIAL CONCENTRATED LIME-SULPHUR WASH.

There are several brands of the "commercial" concentrated lime-sulphur solution now upon the market. The use of these instead of the home cooked kinds is becoming more and more common every year, especially by fruit growers who do not care to take the time or trouble to cook the material for themselves or if they do not have good facilities to do so. They are now reasonable in price,—of fairly uniform strength, and do add to the ease of getting ready to spray as all that is necessary is to dilute with the required quantity of water.

TESTING AND DILUTING CONCENTRATED LIME-SULPHUR.

Every "batch" of the home made concentrated lime-sulphur wash will have to be tested when cooled to determine its strength and it will be well to test the "commercial" brands. This testing is done with a Baume hydrometer. It is a simple instrument used to determine the weight and density of liquids. It is made of glass, is about a foot long, and has a graduated scale on the side.

It is absolutely necessary that the hydrometer be kept *perfectly clean*. If the solution is allowed to dry on it an accurate test cannot be made.

It can be purchased from dealers in druggists supplies or from Bausch and Lomb Optical Company, Rochester, N. Y., or Whitall Tatum Company, Philadelphia, Pa., or Taylor Instrument Companies, Rochester, N. Y.

(See last page for the rates of dilutions.)

DILUTE LIME-SULPHUR SOLUTION.

For spraying on the foliage of apples, pears, European plums and cherries but not on peaches or Japanese plums, grapes or potatoes.

This solution can be prepared for use in several ways.

First, The "Commercial" concentrated lime-sulphur solution can be diluted to the proper strength.

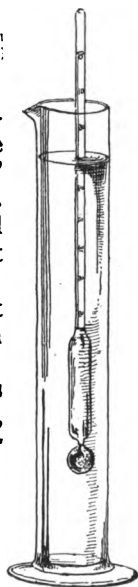
Second, The "home made" concentrated lime-sulphur can be diluted to the proper strength.

Third, The solution can be made at any time and in any quantity as follows: Boil in a few gallons of water for one hour, *twice* as many pounds of sulphur as of lime, strain and dilute with water so there will be 8 pounds of sulphur to every 100 gallons.

Example: To make 100 gallons of spray solution, boil 8 pounds of sulphur and 4 pounds of lime as directed.

SELF-BOILED LIME SULPHUR MIXTURE.

This is a mixture of lime, sulphur and water and not like any of the other lime-sulphur sprays. It does not (when properly made) injure



tender foliage and is very valuable for spraying peaches and Japanese plums.

The formula is:

Lump lime	8 pounds.
Sulphur	8 pounds.
Water	50 gallons.

The mixture can be prepared better by using thirty-two pounds of lime, thirty-two pounds of sulphur, and eight or ten gallons of water, and then diluting to 200 gallons.

Place the lime in a barrel and add enough water to almost cover it, as soon as the slaking begins, add the sulphur, which should be run through a sieve to break up the lumps.

Stir constantly and add enough water to make a thick paste and then, gradually, a thin paste. As soon as the lime is well slaked, cold water should be added to cool the mixture and prevent further cooking. It is then ready to be strained into the-spray tank, diluted up to the full formula, and used.

Care must be taken not to allow the boiling to proceed too far, if the mixture remains hot for fifteen or twenty minutes after the slaking is completed, some sulphur will go into solution and injury to the foliage may result.

The time of adding the cold water to stop the boiling depends upon the lime. With a sluggish lime all the heat in it may be needed, while with limes that become intensely hot, care must be taken not to allow the boiling to proceed too far.

SOLUBLE SULPHUR.

There has appeared on the market a form of sulphur that readily dissolves in water, and is recommended as a substitute for lime-sulphur. It has not been tested by this Experiment Station nor any other so far as we can learn. We therefore are not in a position to pass any opinion upon its value as a spraying mixture.

BORDEAUX MIXTURE.

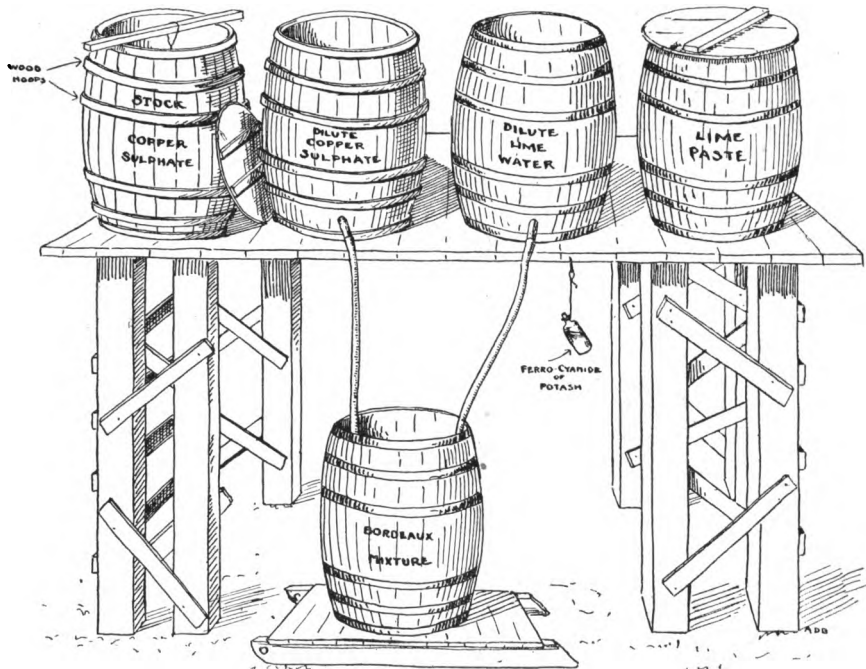
Bordeaux mixture is made of copper sulphate, lime and water.

These three substances are combined in various proportions, depending upon the kind of plant to be treated. For apples, pears, cherries and plums (except the Japanese varieties) the preparation is usually four pounds of copper sulphate, with about the same amount of lime, to fifty gallons of water. Poison is added as needed. The copper sulphate will readily dissolve in two gallons of hot water, to which should be added enough water to make twenty-five gallons or one-half barrel. Do not use an iron or tin vessel to dissolve this in, as the copper sulphate will destroy it, and besides the iron will spoil the bordeaux. A wooden pail is good. Slake the lime into a thin paste and add water to make twenty-five gallons. Pour, or let these run together into a third barrel, and the bordeaux is made. When it is emptied into the spray barrel or tank, it should be strained through a brass wire strainer to catch any of the coarse particles.

Whenever it is necessary to use a quantity of the mixture, it is desirable to have the lime and the copper sulphate in "stock solutions." A quantity of lime is slaked to a paste and held so by being covered with water. The copper sulphate, say fifty pounds, is placed in a clean gunny

sack and suspended in a barrel (one with wood hoops is much to be preferred) containing twenty-five gallons of water. This will dissolve in about a day. One gallon of this "stock solution"* is equal to two pounds of copper sulphate.

A good quick way to combine these three substances is as follows: Put the amount of the "stock solution" of copper sulphate required in a barrel, and add enough water to make 25 gallons, or one-half barrel. Put about 7 pounds of the lime paste in a barrel and add 25 gallons of water, making a thin whitewash. Pour, or let these two run together into a third barrel, or directly into the spray barrel or tank, being sure to strain. When partly run in, test with ferro-cyanide of potash† to



make sure enough lime has been used. If Paris Green, arsenate of lead, or any other poison is to be used, make it into a thin paste with a little water and add it to the bordeaux mixture, which is now ready to be used.

COPPER SULPHATE SOLUTION.

Is copper sulphate dissolved in water. It is used by some growers to spray peach trees to prevent the leaf curl where a spraying for scale insects is not required. Two pounds of copper sulphate to 50 gallons of water is strong enough for this purpose.

* Always stir this "stock solution" before dipping any out, in order that what is used may be full strength.

† This chemical can be secured of any druggist. Ten cents worth dissolved in a pint of water will be enough for a season. Drop a very little in the bordeaux, if a reddish brown color appears more lime must be added. If there is no discoloration, there is enough lime. Ferro-cyanide of potash is extremely poisonous, so observe great care in its use.

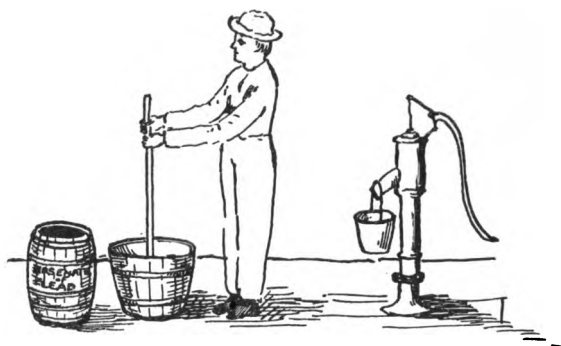
POISONS USED IN SPRAYING.

For Insects That Chew.

. ARSENATE OF LEAD.

This poison is used very extensively. It can be secured for reasonable price, is ready to use at any time, does not easily injure the foliage and is the only poison that can be safely used in the lime-sulphur sprays.

It is usually sold in kegs or "kits" or small barrels in the form of a paste. Some companies have it in a powder form. This form usually costs twice as much or more per pound as the paste form and since it does not contain much water only one-half the amount in weight should be used as is recommended for the paste form.



A simple easy way to work the thick pasty arsenate of lead into a thin smooth paste (as it should be before using either alone or in something) is to put the amount required in a keg; add water and churn with a dasher. This is much quicker than to use a paddle.

PARIS GREEN AND LIME.

Always use lime with paris green, it makes the poison stick better, beside greatly reducing the danger of burning the foliage.

For spraying from a barrel, the writer has found the following method very useful,—Place from one-quarter to one-half pound of good lump lime, or unslaked lime, in each of three or four tin pails which will hold about three quarts or less. Old cans or crocks will answer just as well. Add enough hot water to slake it into a thin cream or paste. Now add to each lot, one-quarter pound of Paris green, previously weighed out, and placed in paper bags, stir while the lime is hot and allow to stand for some time. Now measure out about forty-four gallons of water in your spraying barrel, and make a mark that will show how high it comes in the barrel, add the contents of one tin pail (viz., one-quarter of a pound of paris-green and one-half pound of quick-lime slaked) into the forty-four gallons of water in the barrel. Stir well and

spray. The pails or crocks can be used one at a time and refilled occasionally so that the stock is always on hand ready for use.

ARSENATE OF SODA—KEDZIE FORMULA.

This form of poison was originated at this Station by the late Dr. R. C. Kedzie.

This is a cheap effective poison that can be prepared at home. It is used by many of the grape growers of Michigan in combination with the bordeaux mixture. It cannot be used in the lime-sulphur sprays. If used alone—as is sometimes done for potato bugs—slaked lime must be added or the foliage will be burned.

The formula is:

White arsenic	2 pounds.
Sal Soda (commonly called washing soda)	8 pounds.
Water	2 gallons.

Boil these materials in any iron pot or kettle *not used for other purposes* for about 15 minutes or, until the arsenic dissolves, leaving only a small muddy sediment. Put this solution into a jug or other vessel that can be closed tightly and label "Poison."

One quart of this solution is equal to $\frac{1}{2}$ pound of Paris Green. For most spraying one quart in 50 gallons of water (with some lime) or bordeaux mixture will be sufficient.

CONTACT INSECTICIDES, FOR INSECTS THAT SUCK.

KEROSENE EMULSION.

Place two gallons of ordinary kerosene in a warm place, either in a warm room or in the sun, and allow to become as warm as possible without danger from fire. Boil one pound of laundry soap or whale-oil soap in a gallon of soft water until completely dissolved. Remove the soap solution from the fire, and while still boiling hot, add the kerosene and agitate vigorously for ten minutes, or until the oil is emulsified, with a spraying pump by forcing the liquid back into the vessel from which it was pumped. When the liquid is perfectly emulsified it will appear creamy in color and will flow evenly down the side of the vessel when allowed to do so. Care should be taken to completely emulsify the oil and this is accomplished much more easily when the mixture is hot. This strong emulsion may now be readily diluted with water and used, or it may be stored away for future use. When cold it becomes like sour milk in appearance and should be dissolved in three or four times its bulk of hot water before diluting with cold water. If the water is at all hard, "break" it by adding a little sal-soda before putting in the soap.

Small amounts of this emulsion may be made by using the ingredients in small quantities but in the same relative proportion. It is used at the rate of eight or ten parts of water to one part of emulsion.

HELLEBORE.

White hellebore is the powdered root of a plant. It kills both by contact and as an internal poison. It may be applied either dry or in the form of a liquid. When used dry it should be mixed with three or four times its weight of flour or of plaster and then dusted on the insects. Applied wet, one pound should be mixed with twenty-five gallons of water and this liquid applied as a spray.

INSECT POWDER, BUHACH, PYRETHRUM.

This valuable remedy has one drawback, its cost. It is too expensive for use on a large scale. It kills insects through their breathing pores, but is harmless to man and beast. It will kill many of the insects of the garden if dusted on or applied as a spray at the rate of one ounce to two gallons of water.

Use the powder when it is undesirable to use poison, but never buy any unless it comes in tightly sealed packages. It loses its strength on short exposure to the air. An hour will suffice to weaken it. It must be applied from time to time, as it quickly loses its strength.

TOBACCO.

Tobacco in the form of dust may be obtained of the large manufacturers at a few cents a pound.

It is useful in destroying root-lice, especially woolly-aphis, in young trees, and in keeping insects from garden truck. For root-aphis, incorporate four to six handfuls of tobacco dust into the soil about the roots and induce a thrifty, healthy growth by using liberal quantities of nitrate of soda or barnyard manure early in the spring.

A *strong* infusion or tea made of waste will kill plant lice if sprayed when they first appear.

Nicotine is to be had now in concentrated form. It is more often sold about 40% strong. This may be diluted many hundreds of times before applying. As there is a diversity of grades and brands to be had, it will be well to use the strength recommended by the makers.

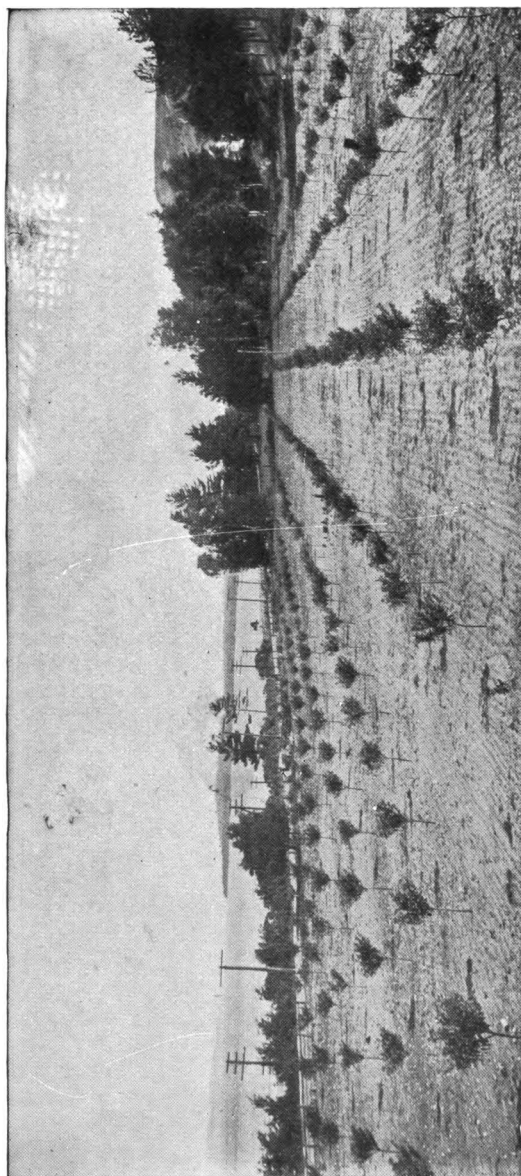
HYDRATED LIME.

Finely slaked lime is often useful because of its slight caustic properties. Against such larvae of saw-flies and beetles as are sticky, for instance those of the cherry-slug and asparagus-beetle, it may be used as a substitute for poison, if the latter, for some reason is undesirable.

Stone lime may be slaked with a small amount of hot water, using just enough to turn it to a dry powder. Such slaked lime is as fine as flour and very soft to the touch, having very little grit. Use a metal pail or kettle to slake in, as the heat may set fire to wood. Do not use too much water, and where possible, use freshly burned lime.

Hydrated lime may be used in making bordeaux-mixture, but it is not as reliable as good, fresh, lump lime. It is less adhesive, not as strong (so more should be used) and more expensive. The one advantage is that it is a little easier to use.

Ground lime for making bordeaux-mixture acts exactly like lump lime, if fresh, but this is difficult to determine as it is already in a powder.



Fruit Raising and Summer Resorting make an Ideal Combination. C. F. Zapf, Grand Traverse County.
Courtesy of the West Michigan Development Bureau.

CAUTIONS.

Do not spray while plants are in bloom. It is prohibited by law, except when canker-worm is present, and may destroy bees and other beneficial insects.

Do not dissolve copper sulphate in an iron or tin vessel. It will ruin the vessel and spoil the spraying solution.

For all spraying solutions containing copper sulphate, the pump must be brass or porcelain lined.

Wash out pump and entire outfit each time after using.

Use arsenate of lead on stone fruits in preference to other forms of arsenical poisons. It is less liable to burn the foliage.

Do not spray fruits or plants with poison within a month or more of the time when they are to be picked.

Keep all "stock solutions" covered to prevent evaporation.

WHEN THE CODLING-MOTH FLIES.

While the first week in August is a good average time for applying an arsenical spray for the second generation of the Codling-moth in Michigan, it is well to remember that seasons vary, and that the time set aims merely at an average. To determine exactly each year just when to get the highest efficiency out of a spray, for a particular locality, requires only a few hours of work, providing one can find some neglected apple trees near at hand.

First of all scrape off all loose bark-flakes from the trunk and limbs of several trees, thus destroying all the natural places for the hiding away of the cocoons. The scraping is most easily done while the bark is soft after a prolonged rain.

Next, make some bands of burlaps six or eight inches broad and three or four layers thick; place one around the trunk of each prepared tree and fasten with a headless wire nail driven into the tree so that the band can easily be removed. Do this in June so that the cloth may become weathered before the time for spinning. The larvae in searching for a good place to spin cocoons will find the bands, in the absence of other protection, and spin cocoons there.

Occasionally examinations during July will reveal these cocoons which should be carefully removed by cutting out a small bit of the cloth to which each is fastened.

Place all these bits of cloth with the cocoons attached in a cage made of a lantern globe or some other glass cylinder open at top and bottom, and then tie a bit of mosquito netting over the top to confine the insects when they come out of the cocoons. If the lantern globe is set on a little soil in a flower pot and the soil is kept just slightly moist, the chances of getting the moths out are increased.

Now put the cage thus prepared in a shady place where the sun cannot strike it to sweat it, and where the rain cannot penetrate. Outside of protection from rain and sun the conditions should be as near those of the outside as possible. Keep the soil in the pot just moist and look for the moths often during late July for they will hide down under the layers of burlaps and may be overlooked. When you see them in the cage, then you will know that they are laying eggs in the orchard and the time to spray is just before the young hatch and go into the fruit, which is about a week or ten days later, not afterward. Of course they do not come out all together but string along over quite a period.

TABLE OF DILUTIONS FOR CONCENTRATED LIME-SULPHUR WASH.

To spray for San Jose and Other scale insects.		Summer Sprays for Apples, Cherries, and European Plums.	
If Baume test is	Amount below should be diluted to 50 gallons.	If Baume test is	Amount below should be diluted to 50 gallons.
33	6½ gallons	33, 32 or 31	1½ gallons
32	6½ gallons	30, 29 or 28	1½ gallons
31	6½ gallons	27, 26 or 25	1½ gallons
30	7 gallons	24, 23 or 22	2 gallons
29	7½ gallons	21, 20 or 19	2½ gallons
28	7½ gallons		
27	8½ gallons		
26	8½ gallons		
25	9 gallons		
24	9½ gallons		
23	9½ gallons		
22	10 gallons		
21	10½ gallons		
20	10½ gallons		
19	11½ gallons		
18	11½ gallons		
17	12 gallons		
Summer Spraying of Pears.			
		33, 32 or 31	1 gallon
		30, 29 or 28	1½ gallons
		27, 26 or 25	1½ gallons
		24, 23 or 22	1½ gallons
		21, 20 or 19	2 gallons

REPORTS FOR 1909-10.

[Through some mistake, the following reports were omitted from the previous annual report. They are here inserted, as a matter of record.—Secretary C. E. Bassett.]

REPORT OF TREASURER FOR 1909-10.

James Satterlee Treasurer in account with the Michigan State Horticultural Society. Balance on deposit in City National Bank, Lansing, Michigan.

1909.

Dec. 6, To balance on hand at time of annual meeting \$784 29

1910.

Jan. 13, By M. A. C. Students competitive judging:

U. S. Crane—first prize..... \$15 00

C. B. Tubergen—second prize..... 10 00

R. G. Voorhorst—third prize..... 5 00

March 13, By C. W. Garfield, Treas. Lyon Memorial Fund, Check

600 00

Nov. 14, To C. E. Bassett, 554 annual members at 50c \$277 00

32 life members at \$5.00.. 160 00

dues, auxiliary societies.. 72 25

Nov. 14, By C. E. Bassett, order for salary 6 months. 300 00

Fennville Herald, printing 8 00

R. A. Smythe itemized bill

(expenses) 12 13

Postage 6 months 12 50

express paid 35c and 60c. 95

Dec. 1, By J. Satterlee, check for record books and

postage 1 50

Dec. 1, To C. E. Bassett, 3 life memberships at \$5.00 15 00

Dec. 1, To C. E. Bassett, bank interest 4 85

Totals \$1,313 39 \$965 08

Balance on hand..... 348 31

\$1,313 39

The assets of the Lyon Fund and the cash transactions of Treasurer Garfield of the Board of Trustees of the Lyon Memorial Fund appears in connection with my report as secretary of that board.

Respectfully submitted,
JAMES SATTERLEE, Treasurer,
Benton Harbor, Mich., Dec. 8, 1910.

REPORT OF THE BOARD OF TRUSTEES OF THE LYON MEMORIAL FUND.

On November 16 the Board met in the city of Kalamazoo at the time of the annual meeting of the Michigan State Forestry Association. Present C. J. Monroe, president; C. W. Garfield, treasurer and J. Satterlee, secretary.

Treasurer Garfield stated that his report would show sufficient funds on hand in excess of the original amount of the Lyon Fund to liquidate the balance of the State Society's note. It was the judgment of the Board that it would be proper to recommend to the State Society that this note be cancelled and the Lyon Fund fixed permanently at the original amount, \$7,548.66 or at some such other definite amount, say \$7,600.00, as the society may deem wise, from the funds now on hand. On motion this action was recommended. It remains with the society to decide whether the fund accrued from life membership since the creation of the Lyon Fund shall be placed in the hands of the treasurer of this board of trustees for investment, or left in the hands of the treasurer of the State Horticultural Society. Under the constitution of the State Society it must remain a permanent fund of which the income only can be used for the general purposes of the society.

If these matters can be definitely settled at this meeting it will be a very simple matter for us to start with a clean sheet and from this annual meeting carry out the letter of the trust, by turning over each half year the accrued income of the entire fund to the treasurer of the State Society for the use of the society.

Respectfully submitted,
JAMES SATTERLEE, Secretary,
Benton Harbor, Mich., Dec. 7, 1910.

(Memorandum.)

President Monroe was directed by the society to put the graves of Mr. and Mrs. T. T. Lyon in the cemetery at South Haven in order. This action was taken at Kalamazoo in 1909. The matter was attended to and the bill \$17.50 allowed by the State Society at its meeting at Benton Harbor in 1910 and a check has been sent to Mr. Monroe in payment of the bill.

J. SATTERLEE, Lansing, Dec. 10, 1910.

REPORT OF TREASURER GARFIELD OF THE BOARD OF TRUSTEES OF THE LYON MEMORIAL FUND.

Statement made on the tenth of November, 1910.

1909.	Dr.	Cr.
Nov. 13, To Cash in bank.....	\$1,297 10	
Coupon cashed	30 00	
Dec. 17, To Worden Grocery Co. coupons.....	70 00	
Dec. 17, By Investment.....		\$500 00
Dec. 23, To Anderson interest.....	20 00	
Dec. 31, To Bank interest	14 10	
1910.		
March 4, To Morrill Orchard coupons.....	90 00	
March 26, By Detroit Gas Bond.....		1,026 81
March 30, To Check from Treas. Satterlee....	600 00	
March 31, To Greenhouse coupons.....	45 00	
Apr. 8, By Drummond Timber bond.....		508 08
Apr. 28, To Rent of South Haven land.....	137 50	
June 2, To Worden Grocery Co. coupons.....	70 00	
June 30, To Bank interest	5 61	
Sept. 30, To Greenhouse coupons.....	45 00	
Sept. 30, To Drummond Timber coupons.....	15 00	
Sept. 30, To Detroit Gas coupons.....	25 00	
	<hr/>	<hr/>
Totals	\$2,464 31	\$2,034 89
Balance in bank		429 42
		<hr/>
		\$2,464 31

Benton Harbor, Mich., December 7, 1910.

ASSETS OF THE LYON MEMORIAL FUND, NOV. 10, 1910.

Statement of Treasurer Garfield.

1910.

Nov. 10, Cash in Grand Rapids Savings Bank.....	\$429 42
Anderson mortgage, principal	700 00
Anderson mortgage, interest	64 00
Morrill Orchard bond	1,000 00
Morrill Orchard bond coupon uncashed.....	30 00
Worden Grocery Co. preferred stock.....	2,000 00
Grand Rapids Green House Co. bonds.....	1,500 00
Drummond Timber bond	500 00
Detroit Gas bond	1,000 00
Dykema note	325 42
Horticultural Society note, principal.....	834 30
Interest on above estimated.....	35 00
Total	<u>\$8,418 14</u>

Aside from the above we have the South Haven realty which is rented to the State Board of Agriculture and growing in value with the years. (Memorandum.)

At the meeting of the executive board of the State Horticultural Society held at Benton Harbor on December 8, 1910, the matter of placing the life membership fund which has accrued (\$245.00), since the acceptance of the Lyon bequest, in the hands of Treasurer Garfield was brought before the Board by Treasurer Satterlee of the State Society and on motion it was decided to recommend to the Society that this money and such other moneys as may come into the fund in future be made a part of the Lyon Memorial Fund for permanent investment.

J. SATTERLEE,
Secretary Board of Trustees of Lyon Memorial Fund.

ANNUAL REPORTS

OF

LOCAL HORTICULTURAL SOCIETIES.

BERRIEN COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to the State Society.)

George Friday,	-	-	-	-	-	-	-	-	President.
C. H. Hilton,	-	-	-	-	-	-	-	-	Vice-President.
Charles A. Pratt,	-	-	-	-	-	-	-	-	Secretary.
J. M. Cunningham,	-	-	-	-	-	-	-	-	Treasurer.
Henry Ewald	}	-	-	-	-	-	-	-	Directors.
L. W. Ruth		-	-	-	-	-	-	-	
Miss E. McIsaac		-	-	-	-	-	-	-	

MEMBERS FOR 1912.

H. H. Hogue, Sodus, R. 1.	Joseph Richard, Benton Harbor, R. 1.
Mrs. H. H. Hogue, Sodus, R. 1.	C. H. Mitchel, Benton Harbor, R. 6.
E. McIsaac, Benton Harbor, R. 4.	R. J. Lass, Benton Harbor.
I. McIsaac, Benton Harbor, R. 4.	J. W. Reed, Jr., Benton Harbor, R. 4.
L. W. Ruth, Benton Harbor.	L. T. Burr ridge, Benton Harbor.
G. S. Drake, Benton Harbor, box 1201.	J. H. Chamberlain, Benton Harbor, R. 3.
Ralph Ballard, Niles, R. 4.	J. E. Remer, Benton Harbor, R. 3.
Henry Pump, Benton Harbor, R. 6.	B. F. Gersonde, Benton Harbor, R. 1.
John Meas, Benton Harbor, R. 1.	F. W. Dunnbar, Benton Harbor, R. 4.
I. Barber, Benton Harbor, R. 4.	Chester Seel, Benton Harbor, R. 1.
W. A. D. Rose, Benton Harbor, R. 4.	F. H. Ulbright, Benton Harbor, R. 1.
F. J. Ewald, Benton Harbor, R. 1.	Exilda Camfield, Benton Harbor, R. 4.
Roy Clark, St. Joseph.	J. F. Carter, Benton Harbor.
H. A. E. Hesscloth, Benton Harbor,	C. E. Shafer, Benton Harbor, 141 Lake
R. 2.	Ave.
Jacob Friday, Coloma.	T. Hagaman, Benton Harbor, R. 1.
W. M. Wissing, St. Joseph, R. 1.	Chas. Gage, Benton Harbor, R. 4.
Henry Seel, St. Joseph.	M. Hoffman, St. Joseph, R. 2.
Geo. Friday, Coloma.	Jacob Antis, Benton Harbor, R. 3.
I. A. O'Leary, R. 3.	S. L. Reed, Benton Harbor, R. 4.
C. L. Kelley, Benton Harbor, R. 1.	F. T. Miller, Coloma, R. 2.
R. A. Stanton, St. Joseph, R. 1.	A. B. Bishop, Coloma, R. 2.
N. B. Rector, Sodus.	F. A. Hobbs, Benton Harbor.
Irven Spencer, Benton Harbor.	E. S. Pulsipher, Benton Harbor, R. 1.
W. G. Newland, Benton Harbor.	W. J. English, 519 N. Linden St., Mar-
Arthur Dickinson, Benton Harbor, R. 4.	shall.
Cyrus L. Weaver, Niles, R. 6.	C. P. Gooddell, St. Joseph.
C. A. Pratt, Benton Harbor, R. 4.	A. L. Dickinson, Benton Harbor, R. 4.
Geo. Fritz, St. Joseph.	J. G. Wright, Benton Harbor, R. 4.
J. M. Cunningham, Benton Harbor.	J. A. Stump, Sodus.
Sam Hall, Benton Harbor.	H. E. Brant, Coloma.
T. C. Prillwitz, Sodus.	L. T. Sutherland, Benton Harbor, R. 6.
W. J. Pope, Benton Harbor, R. 1.	N. B. Mosher, Berrien Center, R. 1.
Albert Russell, Benton Harbor, R. 1.	Alford Batzback, Watervliet, R. 2.
C. H. Kendall, Eau Claire, R. 3.	C. E. Hilton, Benton Harbor.
Lyod Carmichal, Benton Harbor, R. 1.	C. H. Hilton, Benton Harbor.
Horace Tabor, Eau Claire.	Geo. S. Port, Coloma.
Geo. W. Loomer, Benton Harbor, R. 1.	Aug. Schneider, Benton Harbor, R. 1.
R. O. Woodruff, Benton Harbor, R. 4.	Chas. Cook, Coloma, R. 3.
J. T. Beckwith, Benton Harbor.	S. McCord, Benton Harbor.
D. M. Well, Benton Harbor, R. 3.	Frank Tillstrom, Sodus.
William Murphy, Sodus.	Ben Abels, Coloma, R. 3.

E. H. Peters, Benton Harbor, R. 3.
 Frank Ortlepp, Coloma, R. 3.
 W. W. Knapp, Watervliet, R. 4.
 Geo. E. Pullen, Benton Harbor.
 Juan Hess, Benton Harbor, R. 5.
 Henry Pollard, Coloma, R. 3.
 J. T. Johnson, Watervliet, R. 4.
 John Slenker, Coloma, R. 2.
 Chas. Hennesey, Watervliet, R. 4.
 L. J. Deming, Riverside.
 Fred Bishop, Hartford, R. 1.
 C. C. Kniebes, Watervliet, R. 4.
 R. E. Vernon, Benton Harbor, R. 5.
 H. W. Biastock, Sodus.
 Geo. P. Pullen, Berrien Springs.
 John O. Brien, Benton Harbor, R. 5.
 J. P. Versaw, Sodus.
 Wm. Hicks, Benton Harbor, R. 2.

B. J. Earnan, Benton Harbor.
 Chas. Tibbites, Benton Harbor, 156 Edwards Ave.
 B. Bartram, Benton Harbor, R. 4.
 A. K. Thompson, Niles.
 C. T. Jones, Benton Harbor, R. 6.
 W. J. Davis, Benton Harbor, 193 Ohio Street.
 D. L. Ringle Benton Harbor, R. 4.
 C. A. Leland, Benton Harbor, R. 4.
 George Friday, Coloma.
 Carl Tabor, Sodus.
 Jacob C. Weber, Watervliet.
 A. F. Sheldon, Riverside.
 M. Thar, Riverside.
 N. E. Wadsworth, St. Joseph, R. 1.
 F. McKee, Benton Harbor, R. 3.
 L. Camfield, Benton Harbor, R. 4.

December 1-8, 1910, the Berrien County Horticultural Society met in connection with the State Society at Benton Harbor and it was a meeting of great benefit to the local fruit growers.

January 26, 1911, George Friday of Coloma gave a very interesting talk on peaches, pointing out that the fruit growers should give them better care and study his local conditions more.

M. Thar of Riverside followed with a very interesting paper on strawberries. Mr. Thar has been a very successful strawberry raiser and claimed that they should have the best of culture and should always be mulched.

February 28, 1911, the Society held its annual spray meeting. C. A. Pratt gave a talk on the methods of making home-made lime sulphur and pointed out that it was cheaper and just as effective as the commercial.

Donald Dickinson, a young fruit grower of Benton Harbor told of his methods of growing fancy pears. He has been very successful and claimed it was due to his not neglecting any of the operations necessary in the culture of fancy fruits.

R. A. Smythe followed with a talk on legislation, telling of the bills that were up for uniform package and one requiring the growers to put their names on their packages.

Frank Howard gave a paper on his methods of spraying apples. He has 54 apple trees and the summer of 1911 he raised over 700 barrels on those trees. Below is his method of spraying as he gave it to the society:

Spraying the Apple Orchard.—The first spray to be applied to the trees should be sulphur and lime for scale, any time in March when it is not freezing. Get at this work early before your other work gets too pressing or the last day or two of your spraying may get slighted. We make our own mixture of sulphur and lime, cooking it by steam, it costing \$3.40 per 50 gallon barrel, not including our work or fuel. Great care should be taken in applying this spray or many scale will be missed and left to breed the coming season therefore your time and money will be thrown away.

The second application, we believe, should be Bordeaux mixture applied at the rate of 4-6-50 before the buds start. This is the spraying to control the apple scab so do not delay.

Third application, Bordeaux mixture 4-6-50 adding 3 pounds of Arsenate of Lead, apply just before the blossom buds open. Don't delay this application until half of the blossom buds are open or if you do you will do more harm than good.

Fourth application, just after the blossoms fall, using 3 pounds of Arsenate of Lead to 50 gallons of water. This spraying we believe to be the most important one for the control of the codling moth. Do not delay this application a week or ten days for delay may mean a loss of half of your crop.

Fifth application to be applied from twelve to sixteen days later using lime sulphur solution at the rate of one and one-half gallon of the mixture to fifty of water, adding 3 pounds of Arsenate of Lead.

We use now only two applications of Bordeaux mixture during the season. The

remainder of the season we use Lime Sulphur in its place as there is less danger of burning with this spray.

On Dutchess I think these five sprayings sufficient but winter varieties, such as Spy, Baldwin and Greenings, perhaps three or even four more may be needed, the last two applications to be made about the 5th and 20th of August. Watch your trees and if signs of the codling moth are present *get busy*. Be thorough with your work, apply at the right time and you will certainly win. Use a pressure of 125 to 150 pounds. We use coarse caps on the spray nozzle. Some prefer a fine mist as a spray but we don't.

SAUGATUCK AND GANGES POMOLOGICAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Edward Hutchins, Fennville, R. F. D. 1,	-	-	-	-	-	President
Charles B. Welch, Fennville, R. F. D. 2,	-	-	-	-	-	Secretary.
Horace G. Welch, Fennville, R. F. D. 2,	-	-	-	-	-	Treasurer.
Charles E. Bassett	}	-	-	-	-	Vice-Presidents.
H. H. Goodrich						
E. H. House						

MEMBERS.

Hutchins, Edward, Fennville, R. 1.	Wedge, J. D., Allegan, R. 4.
Wiley, D. W., Douglas.	Plummer, L. E., Fennville, No. 1.
Dunn, Wm. H., Ganges.	Weed, P. P., Fennville, R. 2.
Atwater, E. H., Ganges.	House, E. H., East Saugatuck, R. 1.
Davis, Chas., Fennville, R.	Wark, Edward, Fennville, R. 2.
Plummer, Wm. H., Fennville.	Eubank, O. V., Fennville, R. 1.
Goodrich, H. H., Ganges.	Cleffy, James, Fennville, R. 1.
Gooding, T. L., Fennville, R. 1.	Birkholz, Chas., Fennville, R. 2.
Gaze, Geo. C., Fennville, R. 3.	Hayes, John R., Fennville, R. 2.
Leland, E. P., Fennville, R. 1.	Heinze, Emil, Fennville, R. 2.
Rickert, W. C., Douglas.	Miller, Jesse L., Bravo, R. 2.
Taylor, Grace L., Fennville, R. 2.	Stevens, A. H., Bravo, R. 2.
Fabun, J. C. Bravo, R. 2.	Schringer, David, Bravo, R. 2.
Paquin, N., Bravo, R. 2.	Symons, Chas., Bravo, R. 2.
Wedge, J. D., Allegan, R. 4.	Dorning, J. F., Bravo, R. 2.
Broe, P. H., Fennville, R. 3.	Dailey, Chran, Bravo, R. 2.
Herbert, Fred, Douglas.	Repp, Lewis, Bravo, R. 2.
Tillinghast, Clark, Douglas.	Wells, Henry, Bravo, R. 2.
LaDick, Wm. Fennville, R. 1.	Wright, Perry, Bravo, R. 2.
Funk, J. M., Bravo, R. 2.	Berry, John, Glenn.
Chapman, J. G., Fennville, R. 1.	Williamson, C. P., Bravo, R. 2.
Thompson, A. Saugatuck.	Hamlin, W. M., South Haven, R. 2.
Kenter, Vern, Fennville, R. 1.	Wolfgang, L. C., Bravo, R. 2.
Kingsbury, E. E., Fennville, R. 1.	Wadsworth, Jas. Fennville.
Rouse, W. E., Fennville, R. 1.	Stillson, W. B., Fennville, R. 1.
Kerr, Wm. Douglas.	Howland, David, Fennville, R. 2.
Plummer, F. W., Fennville, R. 1.	Hoover, A., Fennville, R. 1.
Kitchen, M. W., Fennville, R. 1.	Munger, R. C., South Haven, R. 2.
Cawthorp, F. S., Bravo, R. 2.	Weed, Mrs. Will, Fennville, R. 2.
Dreher, Adolph, Fennville, R. 2.	James, Harvey, Bravo, R. 2.
Turrell, W. J., Fennville.	Hilbert, Henry, South Haven, R. 2.
Kibby, W. J., Fennville, R. 2.	Smith, C. S., South Haven, R. 2.
Knox, A. R., Fennville, R. 1.	Fabun, J. C., Bravo, R. 2.
Kingsbury, A. O., Fennville, R. 3.	Conrad, S. L., Bravo, R. 2.
Hirner, John, Fennville, R. 2.	Dean, G. D., Fennville, R. 1.
Mosier, Frank, Fennville, R. 3.	Armstrong, W. H., South Haven, R. 2.

REVIEW OF PAST MEETINGS.

Two meetings a month were planned for the winter months to be held at different places, which plan was mostly carried out. The summer being an unusual busy one few meetings were held.

Two subjects have been of unusual interest. One the lime and sulphur spray. Whether to use it for a summer spray on apples in place of Bordeaux or not, and whether to buy the commercial article or use the home made concentrated.

The growers here were fortunate in having Prof. Hammer and Scott, of the U. S. Government Entomological Laboratory which was located at Douglas, with them and who did experimental work in several orchards. Prof. Hammer's work with the codling moth and the information given the growers from time to time when to spray to do the most effective work undoubtedly helped in producing the large crop of fine apples which were grown in the Fennville district this year. It was demonstrated that the weather or other conditions bring out the codling moth at different periods and that the date established to spray for them cannot be depended upon to do the most effective work. The experiences of the past year would go to show that it would pay the growers to have an entomologist on the ground, that the saving in fruit, labor and spray material, when the spraying was done at the proper time would more than pay the salary of a man to study the conditions not only of the codling moth, but other things and enable the grower to get this information quick.

The work of Prof. Scott in experimental spraying of both peach and apple, the sprays used and the methods employed was a help in preparing the sprays and a saving in their application. Unusual interest has been shown this year in the summer spraying of apples with lime and sulphur. A fine crop of clean apples attested to the efficiency of the concentrated lime and sulphur and arsenate of lead. There is a growing interest in the home made article, both from the results of its use and the economy in making it. Every experiment carried on in orchards of members of the Society by Prof Scott showed the best results from the home made concentrated. Experiment made showed better results and a saving in material when made to test 28 to 30 Beaume rather than 33. The fruit grower can make his own concentrated lime and sulphur during the late winter or wet times in early spring and have a supply on hand when needed which often times proves a most profitable investment. It is not difficult to make and the cost can be easily computed. 125 pounds sulphur and 65 pounds lime will make 50 gallons of the concentrated which will make 400 gallons or more of spray for winter spraying that will kill the San Jose scale. One important thing is to get good lime. Lime high in magnesia will not make a good article. Fortunately we have in Michigan a good lime that is very low in magnesia. This lime analyzed over 96 per cent calcium oxide and less than .01% of magnesia. This lime is manufactured by the Northern Lime Company of Grand Rapids.

More members of our Society are planning to make their own lime and sulphur this year than before, and many not making are having it made for them by local plants. Where a grower has put up a plant and made for his neighbors it has proven a very satisfactory and economic arrangement.

Another subject which has been taken up by the Society and which proved to be a popular movement, interest in which has been growing ever since, is the marketing of our fruits. During the fall there was very little activity in the apple market around Fennville. Whether it was a concerted action of the buyers or not it was very evident there was an understanding among them in regard to prices. They reported a very large crop throughout the country, much higher than the government crop report did. The price offered when any offer was made, was very low, around \$1.50 per barrel for No. 1 apples. The Society called a meeting of the apple growers, buyers and commission men interested to talk over the situation. A large attendance was had, buyers and commission men coming from a distance. It was evident before the meeting had proceeded far that there was nothing to be gained. The buyers stated there was a large crop of apples and prices would be low; that apples could be bought in other sections at very low prices. It developed upon inquiry that the buyers had secured most of the cold storage available. This was not to the liking of the growers and another meeting of the growers only was called at which it was decided not to take less than \$2.50 per barrel for No. 1 apples.

A committee was appointed to look up cold storage which was done, but the

demand for apples became more active with an upward turn in prices, in instances going above the \$2.50 per barrel price for No. 1 stock.

Considering that the apple crop of this section is one of importance, being larger by considerable than some of the western places that do so much advertising, the move proved to bring forcibly to the growers the middlemans part in marketing our farm products. Plans were made at this meeting to form an organization looking to the marketing of our own products. One difficulty has been the lack of uniform grading which this organization proposes to take up, so as to be able to form some plans for cooperative marketing of the apple at least. Michigan can grow as good and with proper care better fruit than many other sections and with a cooperative organization that would enable us to put up uniform grades and cut out the unnecessary expenses the growers could get more for their fruit and make it cost less to the consumers. The feeling is strong that the methods now employed in Michigan are too expensive and far from being up to date. It is hoped in time to have shipping associations in every considerable shipping place and in time to federate the whole for a better understanding of fruit condition, size of crop and marketing. The successful cooperative buying by the State Horticultural Society gives us hope that in a short time we can grow into some cooperative marketing plan.

NORTHPORT FRUIT GROWERS ASSOCIATION.

(Auxiliary to State Society.)

OFFICERS.

R. E. Flood,	-	-	-	-	-	-	-	-	President.
Antoine Bartlett,	-	-	-	-	-	-	-	-	Vice-President.
A. Bentall,	-	-	-	-	-	-	-	-	Secretary-Treasurer.
Antoine Bartlett	}	-	-	-	-	-	-	-	Directors.
Irving Ranger		-	-	-	-	-	-	-	
Isaac Garthe		-	-	-	-	-	-	-	
Robert Probst		-	-	-	-	-	-	-	
C. A. Baumberger		-	-	-	-	-	-	-	

Our Association has now 102 members. Meetings are held at intervals and the best horticultural talent available is brought into touch with our membership.

We are buying largely of spraying material, cooperatively, also buy a good many thousand trees in the same manner, we are thus securing the lowest possible price for spray materials, and the price of trees has been lowered very much.

The orchards in our locality are receiving far more care than formerly, several power sprayers are now in the field, and a large number of good barrel outfits are also in use, and there is a very large increase in interest in all horticultural matters being shown on every hand.

During 1911 we carried on an experiment in cooperative shipping, with which all things considered we were well pleased. It is true that no high prices were realized, because it was not a high price year, but we have demonstrated the fact that for a shipping fee of five cents per barrel, and two cents per bushel basket or crate, we can meet all the necessary expenses of cooperative shipping. This fee paid for outside labels, statements inviting correspondence regarding the fruit for the inside of every package, and printing a set of high grade rules and specifications for grading and packing the fruit. Every shipper signed these rules, and pledged himself to be governed by them, filing a copy with the secretary of the Association. Also the above fee paid for all other printing, telephone, and telegraph service, and for extra help in loading the cars. Iced-cars were used up to the end of the season for wealthy apples, and ordinary box cars after that. We have established a reputation for fruit packed under our label, and have brought about a very much higher grade of packing than was prevailing here before, also we have made it possible for the man having only a few bushels

to ship to get the same service and at the same price as the man with a car load. Another result has been that this shipping experiment has developed a very large correspondence from people living in several states, and our country and also its products is much better known than ever before. We believe that this cooperative shipping idea is alright and that with the details better worked out, and a more correct knowledge of markets; their requirements and their capacities, we shall then be able to dispose of our fruit to much better advantage than under the old system. A list of our members for 1912 is as follows:

- | | |
|--|---|
| A. F. Anderson, Omena. | Kehl, C. B., Northport. |
| Bordeaux Allan, Northport. | Kilcherman, E., Northport, R. |
| Bordeaux, J. A., Northport. | Keyes, S. Omena. |
| Barnes, L. A., Northport. | Leslie, A. M., 201 Main St., Evanston, |
| Barth, Otto., J., Northport, R. | Ill. |
| Barth, Otto, G., Northport, R. | Lackie, W. Omena, R. |
| Brown, A., Omena, R. | Maule, Mrs. Anna, Omena, R. |
| Braman & Son, Northport. | Middleton, Al., Northport, R. |
| Bartlett, Antoine, Omena, R. | Matthews, J. F., Northport. |
| Baumberger, C. A., Northport. | Milliken, A. H., Northport. |
| Barnes, Dell, Northport, R. | Maresh, Antone, Northport, R. |
| Brown, J. D., Northport, R. | Massa, J. A., Northport. |
| Bentall, A., Northport. | McMachen, A., Omena, R. |
| Barth, Walter, Northport, R. | Morgan, N. J., Omena, R. |
| Bartlett, Wm., Northport, R. | Middleton, Elmer, Northport. |
| Bartlett, Oscar, Northport, R. | Middleton, Frank, Northport, R. |
| Birnbaum, J. W., 11205 Superior Ave., | Nelson, C. A., Northport, R. |
| Cleveland, Ohio. | Nelson, W. P., Northport, R. |
| Bowles, J. H., Northport. | Nelson, Andrew G., Northport, R. |
| Brown, W. R., 145 Lake Ave, Grand | Peck, L. R., Northport. |
| Rapids, Mich. | Porter, S. W., Northport. |
| Bartlett, Amos, Northport. | Putnam, B. J., Northport, R. |
| Brace, Julius, Northport. | Probst, R., Northport, R. |
| Baumberger, Fred, Northport, R. | Purkiss, Thos., Northport, R. |
| Budd, Robert, Northport. | Putnam, J. D., Omena, R. |
| Chlausen, P., Northport. | Peterson, Oscar, Northport, R. |
| Curran, J. M., 19 S. LaSalle St., Chi- | Richner, C. A., Omena, R. |
| cago, Ill. | Ranger, Irving, Northport, R. |
| Cutcheon, J. M., Winston, Salem, S. C. | Rogers, L., Northport, R. |
| Dame, G. M., Lansing, Mich. | Sargent, Rev. C. S., 2117 Talbott Ave., |
| Dame, Isa, Northport. | Indianapolis, Ind. |
| Dinsmore, E. J., Northport, R. | Smith, L. C., Northport, R. |
| Egeler, Ph., Northport. | Sanders, D. L., Grand Rapids, Mich. |
| Foltz, W. N., Omena. | Sutherland, Rev. J. W., Lansing, Mich. |
| Flood, D. R. E., Northport. | Steele, W. F., Northport. |
| Fonda, /W. E., 11203 Superior Ave., | Steele, W. H., Northport. |
| Cleveland, Ohio. | Steele, Geo., Omena, R. |
| Frederickson, Nels. Northport, R. | Smith, R. P., Omena, R. |
| Garthe, Isaac, Northport, R. | Scott, J. E., Omena, R. |
| Garthe, Esten, Northport, R. | Scott, Hugh, Northport, R. |
| Garthe, S. C., Northport. | Scott, D. H., Northport. |
| Garthe, Seth, Northport. | Scott, Henry, Northport, R. |
| Gustaff, O. C., Northport. | Scott, Birney, Northport. |
| Gill, Wm., Northport, R. | Schroeder, M., Northport. |
| Gorman, W. P., Omena. | Swanson, Ed., Schomberg, Mich. |
| Griffis, R. E., Omena, R. | Thomas, Robt., Northport, R. |
| Hills, R. E., Delaware, Ohio. | Thomas, J. J., Northport, R. |
| Holton, J. N., Northport, R. | Thomas, W. J., Northport, R. |
| Johnson, Alfred, Northport, R. | Van Holt, J., Omena, R. |
| Johnson, Adalph, Northport, R. | Voice, Walter, Northport. |
| Johnson, Fred, Northport, R. | Wurzburg, P., Northport. |
| Joint, C. L., Omena, R. | Warnquist, A., Northport, R. |
| Krebs, G. J., Omena, R. | Wiley, Robt., Omena. |
| Kehl, Jas., Northport. | Wheeler, L. H., Omena. |
| Kehl, Ed., Northport. | |

SOUTH HAVEN AND CASCO POMOLOGICAL SOCIETY.

(Organized 1871.)

OFFICERS.

Geo. H. Myhan,	-	-	-	-	-	-	-	-	President.
Geo. W. Griffin,	-	-	-	-	-	-	-	-	Vice-President.
H. E. Merritt,	-	-	-	-	-	-	-	-	Secretary.
R. F. Dean,	-	-	-	-	-	-	-	-	Treasurer.
J. C. Hunt,	}	-	-	-	-	-	-	-	Executive-Committee.
E. L. Keasey,									
Jas. Nicol,									

MEMBERS.

C. E. Abell, Phoenix St., South Haven.	H. E. Merritt, S. Haven, R. 2.
R. H. Adkins, 627 Huron St., S. Haven.	E. A. Merson, 507 Phoenix St., S. Haven.
Alfing B. Alfing, S. Haven, R. 6.	C. S. Mills, S. Haven, R. 2.
J. J. Atherley, 120 Oak St., S. Haven.	C. J. Moberg, S. Haven, R. 2.
M. H. Bixby, 752 Wilson St., S. Haven.	A. H. Monroe, Pearl St., S. Haven.
Ernest Burnham, Western Normal, Kalamazoo.	C. J. Monroe, S. Haven.
Geo. E. Chatfield, S. Haven, R. 4.	C. O. Monroe, 360 Pearl St., S. Haven.
Leonard Chambers, S. Haven, R. 5.	A. D. Moore, Phoenix St., S. Haven.
Allen Chesebro, S. Haven, R. 3.	John M. Mott, 405 Erie St., S. Haven.
C. C. Chesebro, S. Haven, R. 3.	Geo. H. Myhan, 203 Dyckman Ave., S. Haven.
A. B. Coith, 829 Phillips St., S. Haven.	Ruth Mary Myhan, 203 Dyckman Ave., S. Haven.
Henry Crabtree, 103 Main St., S. Haven.	A. F. Nagler, 351 Indiana Ave., S. Haven.
R. F. Dean, S. Haven, R. 3.	John G. Nagler, S. Haven, R. 5.
Grafton, E. Flory, S. Haven, R. 5.	Jas. Nicol, S. Haven, R. 2.
M. T. French, 320 Pearl St., S. Haven.	D. Ogden, S. Haven, R. 2.
F. H. Frost, S. Haven.	Jessie E. Oglesby, Lacota.
R. E. Gibson, Phoenix St., S. Haven.	F. W. Osborn, S. Haven.
W. F. Grady, S. Haven, R. 1.	Chas. Ott, S. Haven, R. 5.
B. G. Green, S. Haven, R. 4.	A. W. Overhiser, Kibbie, R. 2.
G. L. Green, S. Haven, R. 4.	F. J. Overton, Bangor, R. 1.
F. A. Gregory, S. Haven, R. 2.	Geo. W. Parish, S. Haven.
Geo. W. Griffin, S. Haven, R. 2.	J. Pedrick, S. Haven.
Willis Hallock, 205 Michigan Ave., S. Haven.	Harry A. Randall, 199 Conger St., S. Haven.
E. A. Hartman, S. Haven.	G. W. Robison, S. Haven, R. 2.
H. C. Heald, S. Haven, R. 3.	Frank E. Rood, Covert.
A. S. Henderson, S. Haven, R. 1.	L. Schwaberow, S. Haven, R. 4.
C. A. Herriman, S. Haven, R. 2.	M. V. Selkirk, Phoenix St., S. Haven.
S. F. Hill, 223 Huron St., S. Haven.	E. E. Shaw, Grand Junction.
D. E. Histed, S. Haven, R. 2.	Ralph P. Sherman, S. Haven, R. 6.
G. R. Hobbs, Bangor, R. 1.	Geo. R. Smith, S. Haven, R. 5.
Jas. Hosking, Jr., S. Haven, R. 1.	A. G. Spencer, Kibbie, R. 2.
A. C. Hult, S. Haven, R. 2.	Burton Sweezy, S. Haven.
J. C. Hunt, S. Haven, R. 1.	J. S. Templeton, 924 Postal Tel. Bldg., Chicago.
W. K. Jacques, S. Haven.	Amos Tucker, Center St., S. Haven.
J. W. Johnson, Phoenix St., S. Haven.	F. E. Warner, S. Haven.
J. C. Johnston, Kibbie, R. 2.	Peter Watkins, S. Haven, R. 3.
John Jutkins, Grand Junction.	Robt. Watt, 832 Phillips St., S. Haven.
E. L. Keasey, S. Haven, R. 1.	Cecil Wilcox, S. Haven, R. 1.
Martin C. Kehoe, S. Haven, R. 1.	F. A. Wilken, 802 St. Joseph St., S. Haven.
Geo. Lannin, S. Haven, R. 6.	Alfred H. Williams, S. Haven, R. 5.
C. D. Leisnring, S. Haven, R. 3.	
E. Lovejoy, S. Haven, R. 5.	
Marshall Mackey, Phoenix St., S. Haven.	
W. C. Marshall, S. Haven, R. 2.	
Ida E. Mennell, S. Haven, R. 4.	

INTERMEDIATE VALLEY FRUIT GROWERS' ASSOCIATION.

(Auxiliary to State Society.)

OFFICERS FOR 1912.

Robert E. Morrow,	-	-	-	-	-	-	-	-	-	President.
Charles S. Guile,	-	-	-	-	-	-	-	-	-	Secretary.
William J. Dewey,	-	-	-	-	-	-	-	-	-	Treasurer.
F. H. Clark,	}									
A. E. Sage,										
I. G. Fisher,										
Elias Burns,										
Charles F. Pinnell,										
Merritt Hodge,	}									- Executive Committee.
Mrs. A. E. Sage,										
Mrs. C. S. Guile,										
Mrs. F. H. Hemstreet,										- Program Committee.

Meetings the last Friday in each month.

MEMBERS WHO HAVE ALREADY SIGNED FOR THIS YEAR.

Abbott, R. E., Bellaire, Mich.	Guile, C. S., Bellaire, Mich.
Adams, Ira A., Bellaire, Mich.	Guyer, Theodore, Central Lake Mich.
Alexander, R. E., Bellaire, Mich.	Harris, E. R., Ellsworth, Mich.
Bacon, J. E., Bellaire, Mich.	Hemstreet, F. H., Bellaire, Mich.
Ball, C. W., Bellaire, Mich.	Hodge, Merritt, Torch Lake, Mich.
Bargy, P. C., Torch Lake, Mich.	Kauffman, D. T., Bellaire, Mich.
Burns, Elias, Central Lake, Mich.	Morrow, R. E., Central Lake, Mich.
Cabanis, Geo. E., Bellaire, Mich.	Mosher, Rev. W. P. Bellaire, Mich.
Carrier, E. G., Bellaire, Mich.	Muckey, E. D., Bellaire, Mich.
Clark, F. H., Central Lake, Mich.	Pinnell, Chas. F., Bellaire, Mich.
Coldren, H. M., Bellaire, Mich.	Sage, A. E., Central Lake, Mich.
Dewey, Wm. J., Bellaire, Mich.	Weiffenbach, Chas., Bellaire, Mich.
Disbrow, N. H., Bellaire, Mich.	Williams, W. G., Bellaire, Mich.
Fisher, I. G., Bellaire, Mich.	Young, Rev. Thomas F., Central Lake, Mich.
Flye, F. D., Bellaire, Mich.	

The Society has been active during the year in creating an interest in better methods in the care of the orchard, in the picking, packing and the marketing of fruit, and the various side helps to successful fruit growing.

It took an active interest in reviving the Antrim County Agricultural Society and largely through its efforts a successful county fair was held under the auspices of that society and several hundred dollars realized for the fair of 1912.

The acreage of fruit is steadily being increased in this county and orchards are being cared for.

CHARLES S. GUILLE,
Secretary.

OAKLAND COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

J. T. Miller, Birmingham,	-	-	-	-	-	-	-	President.
W. D. Flint, Novi,	-	-	-	-	-	-	-	Vice-President.
Miss Addie Sly, Birmingham,	-	-	-	-	-	-	-	Secretary.
Charles A. Bingham, Birmingham,	-	-	-	-	-	-	-	Treasurer.

MEMBERS.

J. F. Deacon, 28 Connecticut Ave., Detroit, Mich.	Jacob Perry, Goodison.
C. W. Haven, Royal Oak, R. 2.	H. C. Gatzka, Birmingham, R. 2.
E. J. Ver Duyn, Novi, R. 1.	Arthur H. Schultz, Pontiac, R. 7.
F. P. German, Birmingham, R. 2.	E. Foster, Clarkston.
A. H. Beebe, Birmingham, R. 2.	Caleb Jackson, Birmingham.
Stanley Case, Franklin.	F. B. Howlett, Pontiac.
L. B. Flint, Novi.	Thomas R. Beddow, Birmingham, R. 1.
Carl Tibbits, Farmington, R. 3.	Frank Tanner, Pontiac.
Charles Bingham, Birmingham, R. 2.	Homer Cummings, Pontiac, R. 5.
H. J. Broughton, Birmingham, R. 2.	James H. Cutcheon, Orion, city address
W. J. Spicer, Birmingham, R. 2.	Detroit Beef Co., Detroit, Mich.
R. J. Coryell, Birmingham, R. 2.	George Bingham, Birmingham, R. 2.
W. D. Flint, Novi.	W. R. Marvin, Pontiac.
J. A. Graley, Pontiac, R. 6.	Howard Masters, Birmingham, R. 5.
John Kleine, Birmingham, R. 2.	Walter A. Carpenter, Troy.
Volney Miller, Birmingham, R. 1.	Ernest E. Green, Orchard Lake.
Miss Sarah, E. Sly, Birmingham, R. 2.	Visgar Spicer, Birmingham, R. 1.
Miss Addie Sly, Birmingham.	Floyd Leach, Birmingham, R. 2.
Edwin Miller, Birmingham, R. 2.	Edwin Leach, Birmingham.
Thomas H. Thurber, Birmingham, R. 2.	William A. Bassett, Birmingham, R. 5.
Albert Sloo, Birmingham, R. 2.	Sidney Colby, Birmingham, R. 2.
R. D. Bird, Birmingham, R. 2.	Charles Knowles, Pontiac, R. 3.
A. C. McGraw, Birmingham.	L. L. Seeley, Pontiac, R. 3.
J. T. Miller, Birmingham, R. 2.	Edward Colby, Birmingham, R. 2.
R. J. Beattie, Birmingham, R. 2.	Casper Case, Birmingham.
William Storey, Birmingham, Briar Bank Farm.	Jackson Voorhels, Davisburg, R. 1.
James W. Cobb, Birmingham.	Bert Foreman, Birmingham, R. 2.
S. H. Tyrer, Pontiac.	Albert Bradway, Birmingham.
C. L. Rockweed, 180 Franklin Ave., Pontiac.	Clarence Higby, Birmingham, R. 2.
Morris M. Jay, Pontiac, R. 5.	Louis Steinkopf, Pontiac, R. 5.
Elmer Evans, Birmingham, R. 2.	William Benedict, Orchard Lake, R. 1
Ward Eagle, Farmington, R. 1.	(Box 81.)
Raymond H. Hyde, Farmington, R. 3.	George Stoll, Birmingham, R. 1.
H. W. Green, Orchard Lake, R. 1.	Ezra Chamberlain, Orion, R. 3.
J. W. Strong, Pontiac, R. 3.	Alvin Leach, Birmingham, R. 2.
S. E. McKinney, Birmingham.	B. D. Wood, Birmingham, R. 2.
Charles Pettibone, Farmington.	Chas. Johnston, Franklin.
William A. Harmon, Pontiac.	A. H. Whitmer, Birmingham, R. 2.
Bert G. Beebe, Holly.	G. A. Cottrell, Milford, R. 5.
	Arch Stoddard, Leonard.
	Andrew Bowden, Franklin.

SOUTHERN WASHTENAW HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

J. W. Hull, Saline,	-	-	-	-	-	-	-	President.
Geo. Feldkamp, Saline,	-	-	-	-	-	-	-	Vice-President.
D. A. Townsend, Saline,	-	-	-	-	-	-	-	Secretary.
B. P. Davenport, Saline,	-	-	-	-	-	-	-	Treasurer.
F. C. Wells, Saline,	-	-	-	-	-	-	-	Prompter.
W. F. Hawxhurst	}							
B. N. Smith								
Dr. F. C. Wells								
Silas Briggs								
A. J. Warren,		-	-	-	-	-	-	Executive Committee.

MEMBERS.

J. W. Hull, Saline.	Geo. Feldkamp, Saline.
W. F. Hawxhurst, Saline.	C. H. Schroen, Saline.
A. G. Cobb, Saline.	D. A. Townsend.
B. J. Spitler, Saline.	A. L. Parsons, Clinton.
Spencer Rogers, Saline.	L. Josenhaus, Milan.
Chas. Graf, Saline, Mich.	Rev. D. C. Littlejohn, Howell.
Henry Bredernitz, Saline.	Albert Graf, Saline.
C. R. Parsons, Saline.	A. J. Warren, Saline.
Geo. Theurer, Jr., Saline.	O. C. Wheeler, Saline.
E. E. Russell, Saline.	W. L. Walling, Saline.
B. N. Smith, Saline.	A. C. Stein, Ann Arbor, R. 1.
Fred Aprill, Saline.	Chas. Dietiker, Saline.
R. W. Mills, Saline.	W. H. Sweet, Saline.
Silas Briggs, Saline.	Austin Robison, Saline.
John Lutz, Saline.	Geo. Braun, Saline.
B. P. Davenport, Saline.	Geo. W. Miller, Saline.
W. H. Barr, Saline.	Edway Young, Clinton.
A. M. Humphrey, Saline.	

During the year 1911 the meetings have been well attended, a great deal of interest shown especially along the lines of spraying and care of old orchards, also the growing of small fruits. At the March meeting Mr. C. E. Bassett, Secretary of the State Horticultural Society, addressed the meeting on the subject of the care of old orchards. This address coming at this time of year proved to be of great value to the orchardists in this community and the salvation of many of the old trees and a good crop of fruit when sprayed properly.

At the June meeting Prof. O. K. White of the M. A. C. spent the day with us, visiting different orchards in this vicinity giving demonstrations in trimming, spraying and thinning the fruit. In the evening he spoke of the cover crop for the orchard.

All the meetings have been both enjoyable and profitable. We predict that Southern Washtenaw may still hold its own as a fruit growing portion of Michigan.

This Society purchased through the State Horticultural Society \$235.56 worth of spraying material. This gave entire satisfaction. The coming year we expect to purchase a still larger amount of material.

MASON COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Smith Hawley,	-	-	-	-	-	-	-	President.
R. J. Fitch,	-	-	-	-	-	-	-	Vice-President.
R. C. Sabin,	-	-	-	-	-	-	-	Secretary-Treasurer

MEMBERS FOR 1911.

R. J. Fitch, Ludington.	S. O. Stover, Ludington.
J. H. Fitch, Ludington.	D. D. Olmstead, Ludington.
Guy Hawley, Ludington.	D. E. Wade, Ludington.
Smith Hawley, Ludington.	W. H. Brown, Ludington.
Michael Fitch, Ludington.	E. C. Barber, Ludington.
Chas. L. Houk, Ludington.	J. A. Sheldon, Ludington.
Joseph Pallasch, Ludington.	L. B. Lyon, Ludington.
C. E. Stewart, Ludington.	O. E. Hawley, Ludington.
Chas. Fitch, Ludington.	Amos Boucher, Scottville.
Hiram Pierce, Ludington.	C. D. Kistler, Ludington.
J. C. Cribbs, Ludington.	D. Jameson, Ludington.
Geo. Cribbs, Ludington.	Jas. Foley, Ludington.
Frank Stearns, Ludington.	D. H. Morton, Ludington.
A. J. Houk, Ludington.	W. H. Dean, Ludington.
Jerome Harmon, Ludington.	Martin Lund, Ludington.
Abe J. Gamertsfelder, Ludington.	E. E. Crotser, Ludington.
Joseph Prevost, Ludington.	V. L. Olmstead, Ludington.
Wm. Metzler, Ludington.	A. R. Benjamin, Ludington.
W. M. Wadel, Ludington.	Theo. Ervin, Ludington.
Louis Hawley, Ludington.	Arthur Morton, Ludington.
Joseph Sellner, Ludington.	P. E. Bailey, Ludington.
John W. Hurley, Ludington.	Isaac VanNortwick, Ludington.
Geo. H. Piper, Ludington.	John H. Burns, Ludington.
Jas. McDonald, Ludington.	John Rinebolt, Ludington.
Wm. Fitch, Ludington.	Phil. Meisenheimer, Ludington.
Ed. Parker, Ludington.	H. D. Stowell, Ludington.
Fred Schwass, Ludington.	C. G. Wing, Ludington.
Jo. Albrecht, Ludington.	Chas. Stearns, Ludington.
Fred Peterson, Ludington.	R. C. Sabin, Ludington.
H. Meisenheimer, Ludington.	Fred Beebe, Ludington.
E. E. Grove, Ludington.	H. R. Gillette, Ludington.
J. H. Gamertsfelder, Ludington.	Daniel Hahn, Ludington.
E. E. Cribbs, Ludington.	Andy. Thompson, Ludington.
John Buffum, Ludington.	C. F. Olmstead, Ludington.
Frank Kibbey, Ludington.	M. H. Hitchcock, Ludington.
Wm. Myers, Tigard, Wash.	G. A. Gifford, Pentwater.
L. L. McClatchie, Ludington.	Will. Kennedy, Ludington.
D. H. Grout, Ludington.	R. H. Brye, Ludington.
Earl Olmstead, Ludington.	E. A. Cowell, Ludington.
J. K. Olmstead, Ludington.	W. H. Dean, Ludington.

MEMBERS FOR 1912.

Albert Kinney, Ludington, R. 1.	Joe. Pallasch, Ludington, R. 1.
L. L. McClatchie, Ludington, R. 3.	D. H. Morton, Pentwater, P. O., R. 1.
Louis Hawley, Ludington, R. 3.	Jas. McDonald, (no paper)
D. H. Grout, Ludington, R. 3.	C. L. Houk, Ludington, R. 3.
Smith Hawley, Ludington, R. 3.	Jesse Houk, Ludington, R. 3.
L. B. Lyon, Ludington, R. 3.	A. R. Benjamin, Ludington, R. 3.
Theo. Ervin, Ludington, R. 3.	Joe. Prevost, Ludington, R. 3.
Andrew Thompson, Ludington, R. 3.	V. L. Olmstead, Ludington, R. 3.

O. E. Hawley, Ludington, R. 3.	Jerome Harmon, Ludington, R. 1.
Wm. Fitch, Ludington, R. 3.	H. D. Stowell, Ludington, R. 1.
C. W. Fitch, Ludington, R. 1.	J. H. Gamertsfelder & Son, Ludington
R. C. Sabin, Ludington, R. 3.	R. 1.
C. G. Wing, city.	Wm. Wadel, Ludington, R. 1.
Geo. Cribbs, Ludington, R. 3.	R. J. Fitch, Ludington, R. 3.
A. J. Houk, Ludington, R. 1.	John Rinebolt, Ludington, R. 1.
J. H. Withey, Ludington, R. 1.	Fred Peterson, Ludington, R. 3.
Martin Lund, Ludington, R. 3.	Michael Fitch, Ludington, R. 3.
Wm. Metzler, Ludington, R. 3.	Frank Kibbey, Ludington, R. 3.
J. H. Burns, Ludington, R. 1.	Arthur Morton, Ludington, R. 1.
J. H. Fitch, Ludington, R. 1.	Donald Jameson, Ludington, R. 3.
Wm. Kennedy, Ludington, R. 1.	Gilbert, Broder, Ludington, R. 3.
Joseph Sellner, Ludington, R. 1.	Fred Beebe, Ludington, R. 1.
W. F. Curratt, Ludington, R. 3.	Henry Meisenheimer, Ludington, R. 3.
J. A. Gamertsfelder, Ludington, R. 1.	

IONIA COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS FOR 1912.

President, Claude Dickerson,	-	-	-	-	-	-	-	Ionias.
Vice-President, Henry L. Nielson,	-	-	-	-	-	-	-	Ionias.
Secretary, Frank E. Hall,	-	-	-	-	-	-	-	Ionias.
Treasurer, Herbert F. Kellogg,	-	-	-	-	-	-	-	Ionias.

MEMBERS.

Herbert F. Kellogg, Ionia.	B. E. Goodwin, Ionia.
Claude C. Dickerson, Ionia.	H. B. Webber, Ionia.
Geo. E. Dickerson, Ionia.	Chas. Stoddard, Ionia.
Perry H. Stebbins, Saranac.	J. R. Densmore, Ionia.
Chas. C. Luce, Ionia.	Wm. Robertson, Ionia.
Ray Normington, Ionia.	Chas. North, Fenwick.
Thos. F. Martin, Ionia.	Arthur Wilson, Ionia.
Luther E. Hall, Ionia.	James A. McCarty, Ionia.
Lee P. Spaulding, Ionia.	Harry S. Knapp, Muir.
E. E. Branch, Ionia.	J. J. Eaves, Ionia.
H. D. Waldron, Ionia.	Samuel Eavey, Ionia.
F. P. Trowbridge, Ionia.	H. R. Bluemley, Butternut.
Herbert L. Smith, Shiloh.	Fred Vanderheyden, Ionia.
Jens Jensen, Orleans.	Clyde Sigourney, Ionia.
H. L. Nielsen, Ionia.	Fred Glostrick, Ionia.
John Flater, Ionia.	D. A. McQuaid, Ionia.
C. I. Goodwin, Ionia.	M. J. Allen, Ionia.
Frank E. Hall, Ionia.	A. G. Smith, Ionia.
Geo. Gott, Ionia.	Elmer Peabody, Shiloh.
Maurice Yeomans, Ionia.	Chas. Begerow, Lake Odessa.
Ivan J. Brooks, Ionia.	James Dildine, Ionia.
Geo. Hulleberger, Saranac.	P. C. Freeman, Lowell.
F. T. Flanagan, Orleans.	E. H. Hunt, Saranac.
Geo. E. Green, Ionia.	Fred Kendall, Ionia.
Chas. Mattison, Ionia.	P. M. Slaybaugh, Orleans.
James Little, Shiloh.	B. A. Yeomans, Ionia, R. 4.
J. B. Welch, Ionia.	George Sage, Ionia.
E. D. Weaver, Ionia.	Daniel Slowinski, Lake Odessa, R. 39.
W. W. Bemis, Ionia.	

MANISTEE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

The Manistee County Horticultural Society, auxiliary of the Michigan State Horticultural Society, was organized at Bear Lake, January 26, 1912.

OFFICERS.

President—Edwin S. Russell,	-	-	-	-	-	-	Manistee.
Vice-President—Arlie L. Hopkins,	-	-	-	-	-	-	Bear Lake.
Secretary—Jos. F. Brunais,	-	-	-	-	-	-	Chief.
Treasurer—Wm. F. Millarch,	-	-	-	-	-	-	Bear Lake.

MEMBERS.

H. M. Jones, Chief.	Roy Welch, Bear Lake.
Mrs. H. M. Jones, Chief.	Chris Sheuly, Chief.
Mrs. B. Burmeister, Onokama.	O. C. Moeu, Chief.
Geo. Appleton, Bear Lake.	A. E. Moeu, Chief.
Mrs. Nellie Wecter, Bear Lake.	F. A. Mitchell, Manistee.
Mable Richmond, Bear Lake.	T. J. Ramsdell, Manistee.
K. M. Jones, Bear Lake.	J. M. Peterson, Manistee.
S. Mallison, Bear Lake.	C. H. Morey, Manistee.
Ed. Oleson, Bear Lake.	B. R. Hendel, Manistee.
F. Bradford, Bear Lake.	Dudley A. Siddall, Manistee.
Geo. Kuenzer, Bear Lake.	Herbert L. Harley, Manistee.
J. E. Merritt, Manistee.	Thomas W. Ferguson, Manistee.
S. L. Smith, Bear Lake.	Lawrence Marsh, Manistee.
C. J. Millarch, Bear Lake.	H. W. Marsh, Manistee.
Matt. Lutz, Chief.	Harlan MacMullen, Manistee.
T. Quinlan, Arcadia.	H. C. Bright, Manistee.
F. E. Brunais, Chief.	C. B. Jentoff, Manistee.
Fred Herrmann, Chief.	Magnus Nelson, Manistee.
Arch Marshall, Bear Lake.	James A. King, Manistee.
J. E. Cody, Bear Lake.	R. R. Ramsdell, Manistee.
Richard Graham, Bear Lake.	L. S. Ramsdell, Manistee.
L. D. Connelly, Bear Lake.	James Mullen, Manistee.
Bert Bowling, Chief.	T. J. Elton, Manistee.
Rev. Geo. Crook, Bear Lake.	George A. Hart, Manistee.
Joseph Patterson, Chief.	P. Smith, Manistee.
P. C. Chamberland, Arcadia.	G. W. Holler, Bear Lake.
Louis Lingg, Bear Lake.	Fred Baird, Arcadia.
J. C. Strichler, Bear Lake.	Carl Pickert, Arcadia.
Jas. H. Millard, Bear Lake.	Charley Starke, Arcadia.
C. N. Russell, Manistee.	Henry Montler, Arcadia.
H. M. Cosier, Bear Lake.	John Bradford, Arcadia.
Mrs. Geo. Cole, Bear Lake.	D. J. Martiman, Arcadia.
Donald Crouch, Onokama.	Carl Bigge, Arcadia.
Bruce McIntosh, Bear Lake.	Chas. P. Matteson, Arcadia.
N. C. Bertleson, Bear Lake.	Wm. D. Ebert, Arcadia.
Archie Graham, Bear Lake.	H. J. Lang, Arcadia.
Peter H. Lass, Bear Lake.	A. Hasse, Arcadia.
Louis A. Herkelrath, Pierport.	Jackson & Oppenheim, Arcadia.
John Cushing, Bear Lake.	Edwards Bros., Arcadia.
E. O. Thompson, Bear Lake.	Shira Bros., Arcadia.

BENZIE COUNTY HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

G. L. Dressel,	-	-	-	-	-	-	-	-	President.
Joseph Smeltzer,	-	-	-	-	-	-	-	-	1st Vice-President.
W. J. Pettitt,	-	-	-	-	-	-	-	-	2nd Vice-President.
E. J. Parker,	-	-	-	-	-	-	-	-	Secretary.
Allen Case,	-	-	-	-	-	-	-	-	Treasurer.

MEMBERS.

George Allen, Frankfort.	Cris. Mathieson, Frankfort.
Victor Allsberg, Elberta.	Peter Mathison, Elberta.
Roscoe Burtker, Elberta.	George M. Moore, Frankfort.
Allen Case, Frankfort.	George Morency, Frankfort.
C. H. Chapman, Frankfort.	R. Mortensen, Arcadia.
N. J. Crawford, Elberta.	J. E. Nelson, Frankfort.
George Cornell, Elberta.	E. M. O'Brien, Thompsonville.
Ed. Crawford, Arcadia.	F. W. Palmer, Frankfort.
John W. Cruse, Honor.	Byron Parker, Frankfort.
C. F. Collier, Frankfort.	E. J. Parker, Frankfort.
E. Curtis, Frankfort.	M. D. Persing, Frankfort.
J. L. Chandler, Elberta.	W. J. Pettit, Benzonia.
J. F. Conboy, Elberta.	V. L. Putney, Arcadia.
W. L. Davis, Frankfort.	Wallace Putney, Arcadia.
E. Dragoo, Elberta.	R. B. Reynolds, Bendon.
G. L. Dressel, Frankfort.	Miss C. H. Rogers, Thompsonville.
John Ehman, Elberta.	Paul Rose, Elberta.
A. Fairchild, Frankfort.	Joseph Smeltzer, Elberta.
Francis Forrester, Elberta.	Wesley Smeltzer, Elberta.
M. E. Gavigan, Arcadia.	L. D. Spafford, Lake Ann.
S. C. Glarum, Elberta.	H. A. Sperry, Frankfort.
Carl P. Gregerson, Frankfort.	Haven Talbert, Frankfort.
John Howard, Arcadia.	W. R. Thomas, Frankfort.
C. Jacobson, Frankfort.	Loyd Valleau, Lake Ann.
Mrs. E. L. Johnson, Frankfort.	J. W. Van Deman, Benzonia.
C. J. Kinney, Frankfort.	Wm. G. Voorheis, Elberta.
C. C. Keillor, Arcadia.	Sam. Willis, Thompsonville.
Mrs. M. A. Knapp, Frankfort.	Byron Wolcott, Elberta.
H. A. Lewis, Frankfort.	Seymour Wright, Elberta.
Wm. Little, Elberta.	U. S. Young, Frankfort.
E. G. Lord, Arcadia.	

KALAMAZOO COUNTY FRUIT GROWERS' SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

President, Chas. Scudder,	-	-	-	-	-	-	Augusta.
Vice-President, Chas. Campbell,	-	-	-	-	-	-	Kalamazoo, Rural 9.
Secretary and Treasurer, H. L. Jacobson,	-	-	-	-	-	-	Kalamazoo, Rural 3.
1st Member of Ex. Board, E. F. Stoddard,	-	-	-	-	-	-	Kalamazoo, Rural 12.
2nd Member of Ex. Board, Fred Bohnet,	-	-	-	-	-	-	Kalamazoo, Rural 9.

MEMBERS.

Wm. Healy, Bloomingdale.	E. J. Shakespeare, Kalamazoo, R. 5.
J. F. Oswald, Doster.	L. H. Stoddard, Kalamazoo, R. 12.
Victor Anson, Doster.	W. T. Vetterlein, Kalamazoo, R. 7.
M. F. Drake, Kalamazoo, R. 9.	Fred Bohnet, Kalamazoo, R. 9.
Anton Mayer, Kalamazoo, R. 9.	H. L. Jacobson, Kalamazoo, R. 3.
A. Bosserman, Kalamazoo, R. 2.	Chas. Scudder, Augusta.
C. Van Zee, Kalamazoo, R. 10.	Chas. Campbell, Kalamazoo, R. 9.
G. A. Cavanaugh, Kalamazoo, R. 10.	E. F. Stoddard, Kalamazoo, R. 12.
Sidney Keechum, Kalamazoo, R. 10.	E. V. Kendall, Oshtemo.
E. R. Jackson, Plainwell.	Wm. Bouman, Kalamazoo, R. 3.
A. R. Hinga, Kalamazoo,	C. S. Bender, Kalamazoo, R. 5.
A. Rolfe, Kalamazoo, R. 9.	Kromdyke & Son, Kalamazoo, 612 Port-
Homer Deal, Kalamazoo, R. 9.	age St.
Wm. Randall, Kalamazoo, R. 10.	Prof. A. M. Nutton, Comstock.
Miss E. C. Reynolds, Kalamazoo.	M. C. Bushon, Augusta.
W. H. Converse, Battle Creek.	

We have had six or seven meetings during the last year and have been aided in these by S. B. Hartman of Athens, F. A. Wilken of South Haven, Prof. White of Lansing, Mr. Scudder of Augusta and Mr. Converse of Battle Creek, who have given us many new and progressive ideas. We are enrolling quite a large number of new hustling members and I think nearly all of the old members will renew. This will give us a larger number of members than we had last year.

THE BELDING HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

Annual meeting held in Belding in the parlors of the Peoples Savings Bank, Tuesday afternoon, Feb. 27, 1912.

Meeting called to order by the president. Ernest E. Chickering appointed secretary for the meeting.

A talk by Oscar Braman of Grand Rapids, after which proceeded to election of officers, the following officers were chosen for ensuing year. President, O. A. Nummer; Vice-President, J. D. Strain; Secretary, Ernest E. Chickering; Treasurer, Ed. Carpenter. Followed by incidental business of the Society and collection of annual dues from the following members.

G. W. Wooldridge, Belding, R. 18.	Ernest Benton, Belding, R. 15.
B. W. McKibben, Belding, R. 18.	A. J. Kohn, Belding R. 18.
B. A. Chickering, Belding, R. 15.	Wm. Noddins, Belding, R. 18.
O. A. Nummer, Belding, R. 18.	J. D. Strain, Belding, R. 18.
Ed. Carpenter, Belding, R. 15.	Ernest E. Chickering, Belding, R. 15.
Wm. H. Chickering, Belding, R. 15.	J. C. Lambertson, Belding, R. 18.
R. W. Belding, Belding, R. 17.	Fred Benton, Belding, R. 18.
E. M. Wooldridge, Belding, R. 18.	Ed. Ostrum, Belding, R. 19.
Ed. Bliss, Belding, R. 19.	

STATE HORTICULTURAL SOCIETY.

HESPERIA HORTICULTURAL SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

Neil McCallum,	-	-	-	-	-	-	-	-	President.
A. D. Himebaugh,	-	-	-	-	-	-	-	-	Vice-President.
H. K. Bush,	-	-	-	-	-	-	-	-	Secretary and Treasurer.
Geo. E. Wilbur,	-	-	-	-	-	-	-	-	Corresponding Secretary.

MEMBERS.

Bird, John.	McCullum, Neil.
Berger, R.	Proctor, F. M.
Brake, D. H.	Potter, H. V.
Bush, H. K.	Pinkerton, Jay.
Beisel, Geo. N.	Utiley, Ralph.
Becker, D. N.	Reynolds, E. M.
Caldwell, James.	Robertson, Wm.
Cockram, Judson.	Reickman, H. P.
Drake, Frank.	Schenbeck, Jacob.
Dempsey, E. A.	Schindler, David.
Drake, Lincoln.	Scattergood, Geo. K.
Darlington, Frank.	Stuckey, C. C.
Enderly, Wm.	Van Wingerton, Geo.
Gronzo, D. J.	Walker, Geo.
Hinebaugh, A. D.	Wachter, Wm.
Host, W. A.	Westbrook, David.
Johnson, Lew.	Walker, C. V.
Kennedy, Wm.	Woodward, Bart.
Kennedy, Thos.	Wilbur, Geo. E.
Mahon, John.	Winters, W. B.
Mills, S. C.	Walker, C. M.
McNeil, Geo.	

CUSTER FRUIT GROWERS' SOCIETY.

(Auxiliary to State Society.)

OFFICERS.

D. W. Leedy,	-	-	-	-	-	-	-	-	President.
F. Bissett,	-	-	-	-	-	-	-	-	Vice-President.
Wm. L. Harter,	-	-	-	-	-	-	-	-	Secretary-Treasurer.
J. Thomas Lair,	}	-	-	-	-	-	-	-	Executive Committee.
Mr. and Mrs. Lehman,		-	-	-	-	-	-	-	
Mr. and Mrs. Pratt,		-	-	-	-	-	-	-	
J. Thos. Lair,	-	-	-	-	-	-	-	-	Prompter.

MEMBERS.

W. E. Metcalf, Custer.	F. E. Bissett, Custer.
Ed. Blocker, Custer.	D. W. Leedy, Scottville.
Wm. L. Harter, Custer.	John Leedy, Scottville.
John Engle, Custer.	John R. Snavelly, Scottville.
Everet Fager, Custer.	J. Thos. Lair, Scottville.
Wm. Slagle, Custer.	John C. Griffin, Scottville.
Clinton Lehman, Scottville.	D. A. Harter, Scottville.
Joe Meyette, Custer.	J. B. Shirkey, Scottville.
C. A. Pratt, Custer.	J. H. Wilson, Scottville.

Geo. Teeter, Scottville.
Wm. Cable, Scottville.
Henry La Belle, Scottville.
E. Hessong, Custer.

Rupert Landis, Custer.
Henry Steele, Custer.
Fred B. Miller, Custer.

SUTTONS BAY FRUIT GROWERS' ASSOCIATION.

(Auxiliary to State Society.)

Preliminary meetings were held in the Suttons Bay Town Hall during the first month of the year 1910. Articles of Association under provisions of Act No. 171 of the Public Acts of Michigan for 1903, were taken out under date of March 19, 1910, which states the purpose for which the Association was formed: "The promotion of the interests of Horticulture and Fruit growing in the county of Leelanau and the State of Michigan, by encouraging the raising of fruits and horticultural products and the development and extension of a market thereof." A meeting was duly called and the following officers were nominated and elected: Philip Egeler, president; Theo. Esch, vice-president; W. M. Payne, secretary; Claus Von Glahn, Treasurer; Directors, W. M. Payne, one year; E. J. Peck, two years; John Blacken; three years; Claus Alpers, four years; Joseph Crocker, five years.

The annual meeting of the Association is held on the first Monday in February of each and every year. At present there are 48 members a few of whom are owners of property within the county but who reside elsewhere but take a live interest in the Association.

Spraying material is purchased by the members co-operatively although the purchase of trees is individual. Several meetings have been held with outside speakers present. Two very interesting demonstration meetings, O. K. White, presiding, were held, one on the farm of Nels Oleson outside the village limits the other on the fruit farm of Marsland & Hinshaw of Provemont, both meetings being well attended. Since the organization of the Association a deeper interest has been taken both in the matter of spraying of trees and in the marketing of the products. In this matter the Association is deeply indebted to Mr. E. O. Ladd of Old Mission and Rev. A. Bentall of Northport, who are ever willing to render assistance in time of need. The time is not far distant when Suttons Bay will be noted as well for her choice fruit as she is today for her potato market.

W. M. PAYNE, Secretary.

MEMBERS.

Enor Christianson, Suttons Bay.
Anton Solon, Suttons Bay.
Conrad Lather, Suttons Bay.
Morgan Steele, Suttons Bay.
Philip H. Portner, Suttons Bay.
Herman Egeler, Suttons Bay.
John Bremer, Suttons Bay.
Claus Alpus, Suttons Bay.
Will Horn, Suttons Bay.
Henry Kahls, Jr., Suttons Bay.
Mat Spinniken, Suttons Bay.
Theo Esch, Suttons Bay.
Philip J. Portner, Suttons Bay.
Philip Egeler, Suttons Bay.
Jno. Deuster, Suttons Bay.
Jacob Esch, Suttons Bay.
Wm. Crocker, Suttons Bay.
Frank Weiler, Suttons Bay.
Ole Larson, Suttons Bay.
Albert H. Hanson, Suttons Bay.
Alber Nelson, Suttons Bay.
Nels Oleson, Suttons Bay.
Wm. Van Glahn, Suttons Bay.
Jno. Blacken, Suttons Bay.

Claus Van Glahn, Suttons Bay.
John Smiseth, Suttons Bay.
John Wahl, Suttons Bay.
Glen Whitmore, Suttons Bay.
Frank Clark, Suttons Bay.
L. E. Bahle, Suttons Bay.
Mara Hoyt, Suttons Bay.
L. H. Marsland, Suttons Bay.
Herman Alpers, Suttons Bay.
Anna Reynolds, Suttons Bay.
Leo Steffens, Suttons Bay.
Herman Alpus, Suttons Bay.
John Kolasik, Suttons Bay.
H. Kahrs, Sr., Suttons Bay.
J. J. Maakestad, Suttons Bay.
J. O. Duncan, Suttons Bay.
Chas. Joynt, Omena.
Albert Freeland, Omena.
S. A. Keyes, Omena.
Green Bros. Omena.
Norman Peterson, Leland.
Chas. Kropp, Good Harbor, via. Maple
City R. F. D. 1.

LENAWEE COUNTY HORTICULTURAL SOCIETY.

OFFICERS FOR 1912.

Albert Ward,	-	-	-	-	-	-	-	-	-	President.
C. H. Kendrick,	-	-	-	-	-	-	-	-	-	Vice-President.
E. W. Allis,	-	-	-	-	-	-	-	-	-	Secretary.
Chas. H. Randall,	-	-	-	-	-	-	-	-	-	Treasurer.
H. C. Bradish,	-	-	-	-	-	-	-	-	-	Librarian.
Mrs. Carnahan,	}	-	-	-	-	-	-	-	-	Table Committee.
Nettie Nickerson,		-	-	-	-	-	-	-	-	
Mrs. Amanda Mason,		-	-	-	-	-	-	-	-	
H. C. Bradish,		-	-	-	-	-	-	-	-	
Harry Moore,	}	-	-	-	-	-	-	-	-	Executive Committee.
Dr. J. E. Westgate,		-	-	-	-	-	-	-	-	
Helen Nickerson,		-	-	-	-	-	-	-	-	
Mrs. Irving Finch,		-	-	-	-	-	-	-	-	
Mrs. Kendrick,		-	-	-	-	-	-	-	-	

Meetings held at Horticultural Hall, Court house, second Wednesday of each month.

MEMBERS.

E. W. Allis, Box 195, Adrian.	Mrs. R. A. Hood, 21 So. McKenzie St., Adrian.
Mrs. Levi Auchampaugh, 57 So. Main St., Adrian.	Mrs. Mary A. Howard, Michigan Ave., Adrian.
W. H. Barrett, 33 Toledo St., Adrian.	Mrs. C. W. Kimball, 69 So. Main St., Adrian.
Mrs. W. H. Barrett, 33 Toledo St., Adrian.	James H. Kelley, 25 Tabor St., Adrian.
H. C. Bradish, 12 Chestnut St., Adrian.	Mrs. James H. Kelley, 25 Tabor St., Adrian.
Mrs. H. C. Bradish, 12 Chestnut St., Adrian.	D. W. Love, 7 St. Joseph St., Adrian.
S. W. Bennett, 60 Dennis St., Adrian.	Mrs. D. W. Love, 7 St. Joseph St., Adrian.
Mrs. S. W. Bennett, 60 Dennis St., Adrian.	G. S. Mann, 40 Finch St., Adrian.
Mrs. H. A. Brainard, 87 North Main St., Adrian.	Mrs. G. S. Mann, 40 Finch St., Adrian.
Mrs. Frank Carnahan, Adrian, R.	Mrs. Amanda Mason, 13 E. Front St., Adrian.
H. L. Cole, Adrian, R.	B. F. Mattern, 137 So. Main St., Adrian.
C. M. Cone, 51 E. R. R. St., Adrian.	Mrs. B. F. Mattern, 137 So. Main St., Adrian.
W. H. Cornelius, Adrian.	John McClenahan, Adrian, R.
Alfred Edwards, 65 College Ave., Adrian.	Miss Margaret McClenahan, Adrian, R.
Mrs. A. Edwards, 65 College Ave., Adrian.	M. R. Morden, 34 Toledo St., Adrian.
Frank Ehinger, Adrian R.	Miss Helen Nickerson, Adrian, R.
Mrs. Harry Fee, 69 So. Main St., Adrian.	Miss Jeanette Nickerson, Adrian, R.
Mrs. Irving Finch, 41 Broad St., Adrian.	Chas. Poucher, 9 Park St., Adrian.
Mrs. Wm. Gurin, 24 N. McKenzie St., Adrian.	Mrs. Chas. Poucher, 9 Park St., Adrian.
Benjamin Gurin, 24 N. McKenzie St., Adrian.	Wm. V. Pierce, So. Winter St., Adrian.
Chas. Gustin, Adrian, R.	Mrs. Wm. V. Pierce, So. Winter St., Adrian.
Mrs. Chas. Gustin, Adrian, R.	Mrs. Jane Pratt, 87 East Maumee, St., Adrian.
H. V. C. Hart, 20 Broad St., Adrian.	Chas. H. Randall, 30 Park St., Adrian.
Mrs. H. V. C. Hart, 20 Broad St., Adrian.	Mrs. Chas. H. Randall, 30 Park St., Adrian.
Rev. Samuel Heininger, 68 West R. R. St., Adrian.	Mrs. E. W. Reeder, 56 Dennis St., Adrian.
Mrs. S. Heininger, 68 West R. R. St., Adrian.	Mrs. Louise Barnum Robbins, 25 Broad St., Adrian.
Mrs. Adelia Hill, Adrian, R.	F. J. Shannon, Adrian, R. 1.
	Mrs. F. J. Shannon, Adrian R. 1.

Miss Nellie Stow, 8 E. Church St.,
Adrian.

Mrs. A. C. Taylor, 119 Michigan Ave.,
Adrian.

Adelbert Ward, Adrian, R.

Dr. J. E. Westgate, Adrian, R.

Mrs. J. E. Westgate, Adrian, R.

A. S. White, 35 Budlong St., Adrian.

Mrs. Chas. Willbee, Sr., 97 N. Locust
St., Adrian.

Mrs. L. L. Wray, 42 College Ave.
Adrian.

B. O. Corbitt, Palmyra, R.

Mrs. B. O. Corbitt, Palmyra, R.

Wm. H. Moore, Palmyra, R.

Mrs. Wm. H. Moore, Palmyra, R.

W. G. Porter, Sand Creek, R.

Mrs. W. G. Porter, Sand Creek, R.
Fred Bay, Blissfield.

Cicero H. Kendrick, Blissfield, R.

Mrs. C. H. Kendrick, Blissfield, R.

B. E. Niles, Blissfield, R.

James Lane, Holloway.

Mrs. James Lane, Holloway.

Mrs. Loudenslager, Seneca, R.

W. C. Smith, Weston.

Hon. M. T. Cole, Adrian, R.

And Mrs. Eliza Parkhurst, Adrian, R.,
died during the year 1911.

LIFE MEMBERS OF THE STATE HORTICULTURAL SOCIETY.*

*NOTE.—A Life membership which was formerly \$10 is now \$5. The fund thus gathered is invested in good securities and only the interest employed for *general* purposes. The Secretary desires information as to the death or change of address of any life member. Notice of the death of a member should be accompanied by a sketch of the life of the deceased one, to be entered in the records of the State Society.

Name.	P. O. Address.	County.
Adams, H. Dale	Galesburg	Kalamazoo.
Adams, Mrs. H. Dale	Galesburg	Kalamazoo.
Aldrich, Geo. C.	Bravo.	Allegan.
Allis, E. W.	Adrian	Lenawee.
Allis, Miss Mary C. (Mrs. Beal)	Adrian	Lenawee.
Ansley, C. F.	Iowa City	Iowa.
Armitage, James.	Monroe.	Monroe.
Arnold, W. D.	Ionia	Ionia.
Aveline, J. B., Rural 5	Montague	Muskegon.
Bailey, L. H., Jr.	Ithaca	New York.
Baker, Klaus, Rural 11, Box 97	Holland	Ottawa.
Baldwin, O. A. D.	Bridgman	Berrien.
Ballard, Ralph, Rural 4	Niles	Berrien.
Barden, F. M., Rural 6	South Haven	Van Buren.
Barnhart, Herbert, Rural 1	Fremont	Newaygo.
Bartram, Burr, Rural 4	Benton Harbor	Berrien.
Bassett, Chas. E.	Fennville	Allegan.
Bates, T. T.	Traverse City	Grand Traverse.
Bauman, F. A., Rural 13	Grand Rapids	Kent.
Baumann, Archie J	New Richmond	Allegan.
Beal, J. L.	Addison	Lenawee.
Beal, W. J.		Massachusetts.
Becker, D. N., Star Route	Hesperia	Oceana.
Beckman, Geo. H., Rural 3	Ludington	Mason.
Bishop, Dr. H. A.	Millington	Tuscola.
Blain, A. W., Supt. Elmwood Cemetery	Detroit	Wayne.
Blue, George	Traverse City	Grand Traverse.
Bowker Insecticide Co., 43 Chatham St.	Boston	Massachusetts.
Bowles, J. H.	Northport	Leelanau.
Brackett, G. B.	Washington	D. C.
Brassert, Walter O., Rural 1	Paw Paw	Van Buren.
Bristol, O. S.	Almont	Lapeer.
Bristol, W. H.	Almont	Lapeer.
Brown, G. L. A.	Decatur	Van Buren.
Brubaker, C. S.	Hartford	Van Buren.
Bruchner, Geo. W.	Monroe	Monroe.
Brunson, Dr. E. E.	Ganges	Allegan.
Bryant, C. T.	South Haven	Van Buren.
Bullock, A. M.	Lapeer	Lapeer.
Burham, W. P.	Ionia	Ionia.
Burton, Turley J.	Mitchell	Indiana.
Burrows, Geo. L., Jr.	Saginaw City	Saginaw.
Caie, Robt.	Yarmouth	Nova Scotia.

Name.	P. O. Address.	County.
Chamberlain, Glenn R., Gas Co.	Grand Rapids	Kent.
Chandler, L. F.	Almont	Lapeer.
Chapman, Austin B.	South Rockwood	Monroe.
Chatfield, Geo. E.	South Haven	Van Buren.
Chilson, Nathaniel	Tower City	Dakota.
Chilson, Miss Ida	Tower City	Dakota.
Church, Wm. E., Title & Trust Bldg	Chicago	Illinois.
Coith, Alwin	South Haven	Van Buren.
Collins, G. H.	Hartford	Van Buren.
Cook, A. J.	Claremont	California.
Cook, C. B.	Owosso.	Shiawassee.
Cook, W. N.	Grand Rapids	Kent.
Cooper, Madison	Calcium	New York.
Countryman, E. J., 111 Galena Ave.	Dixon.	Illinois.
Crane, John H., R. F. D. 1	Fennville	Allegan.
Crawford, Robt. J.	Armada	Macomb.
Curtice, J. E.	Coleman	Midland.
Darlington, Frank, Rural 4	Hesperia	Oceana.
Davidson, C. M. & Co.	Rockwood	Ohio.
Davis, Horace W.	Lapeer	Lapeer.
Davis, W. H.	Perrinton	Gratiot.
Dayton, J. H.	Painesville.	Ohio.
Deamud, J. B., 51 Wabash Ave.	Chicago	Illinois.
Decker, Walter E., Rural 20	Orleans	Ionina.
Dickerson, Claude C., Route 1	Ionina	Ionina.
Dickerson, F. B.	Detroit.	Wayne.
Dickerson, Geo. E., Stage Route	Ionina	Ionina.
Dieckman, Mrs. Josephine M.	East Saginaw	Saginaw.
Dietrich, M. J.	Beulah.	Benzie.
Doyle, Thomas	Monroe.	Monroe.
DuMez, John.	Holland	Ottawa.
Dutton, Chas. S.	Holland	Ottawa.
Dykman, J.	East Saginaw	Saginaw.
Eckard, W. C.	Eaton Rapids	Eaton.
Edwards, O. C. (sanitarium)	Battle Creek	Calhoun.
Elsworth, R. H.	Traverse City	Grand Traverse.
Ernsberger, R. J.	Watervliet.	Berrien.
Farley, Fred.	Almont	Lapeer.
Farrand, T. A.	Eaton Rapids	Eaton.
Field, Wm. A.	South Chicago	Illinois.
Flowerday, Robert.	Detroit.	Wayne.
Frleigh, J. O.	Casnovia	Muskegon.
France, J. G.	Marshall	Calhoun.
Freeman, Mrs. Agnes, 325 E. Jefferson.	Ann Arbor.	Washtenaw.
Friday, George	Coloma	Berrien.
Frost, Frank H., Rural 6	South Haven	Van Buren.
Garfield, Chas. W.	Grand Rapids	Kent.
Gathman, Mrs. Augusta, 1103 Grace St.	Chicago	Illinois.
Gebhardt, Benton	Hart	Oceana.
Geddes, David	Saginaw	Saginaw.
Geisler, Wm., Rural 2, box 92.	St. Joseph	Berrien.
Getz, Geo. F., Lakewood Farm	Holland	Ottawa.
Gephart, H. W.	Hart	Oceana.
Gibson, Mrs. W. K.	Jackson	Jackson.
Graham, Elwood	Grand Rapids	Kent.
Graham, Dr. M.	Jonesville.	Hillsdale.
Grand Traverse Fruit Co., 1008 Ford Bldg.	Detroit.	Wayne.
Grant, John F., 2710 Indiana Ave.	Chicago	Illinois.
Greening, Charles E.	Monroe.	Monroe.
Greening, J. C.	Monroe.	Monroe.
Hale, Charles F., Rural 11	Grand Rapids	Kent.

Name.	P. O. Address.	County.
Hall, Alfred R., R. F. D. 4	Buchanan	Berrien.
Hall, Louis A., Rural 1	Berlin	Kent.
Hall, Luther E.	Ionia	Ionia.
Halstead, J. B.	Farmington	Oakland.
Habegger, Louis	Woodburn	Indiana.
Hamilton, Frank C.	Northville	Wayne.
Hamlin, J. H., Rural 1	Bravo	Allegan.
Hawley, George A.	Hart	Oceana.
Hawxhurst, W. F.	Saline	Washtenaw.
Hayes, N. B.	Muir	Ionia.
Hayden, Mrs. H. A.	Jackson	Jackson.
Heinze, Edward F., R. F. D. 2	St. Joseph	Berrien.
Hemstreet, F. H.	Bellaire	Antrim.
Heuser, J. H., 1262 Monadnock Bldg.	Chicago	Illinois.
Hill, R. Carroll	Coldwater	Branch.
Hinebaugh, Wm. H.	Ottawa	Illinois.
Hoffman, Mrs. Mary Dickinson	St. Joseph	Berrien.
Hoffman, M., Rural 2	St. Joseph	Berrien.
Hogue, H. H., Rural 1	Sodus	Berrien.
Holloway, Geo. F.	Sawyer	Berrien.
Hoopes, Abner	West Chester	Pennsylvania.
Hosner, O. G., Rural 1	Oxford	Oakland.
Howard, J. H.	Arcadia	Manistee.
Howe, J. C.	Old Mission	Grand Traverse.
Hubbard, Geo. M., Rural 1	Jenison	Ottawa.
Huey, Harold E., Rural 2	Shelby	Oceana.
Hughston, J. A., Lock Box 16	Grand Rapids	Kent.
Hunt, L. C.	Eaton Rapids	Eaton.
Husted, Noah P.	Lowell	Kent.
Hutchins, Edward, R. F. D. 1	Fennville	Allegan.
Ilgenfritz, C. A.	Monroe	Monroe.
Ives, Caleb	Monroe	Monroe.
Jaquay, Irving	Buchanan	Berrien.
Jenks, S. G., Rural 3	Shelby	Oceana.
Jerome, Mrs. David H.	Saginaw	Saginaw.
Johnson, R. L.	Lawrence	Van Buren.
Johnson, William	Vassar	Tuscola.
Kales, Dr. John D., Savings Bank Bldg.	Chicago	Illinois.
Keasey, E. L.	South Haven	Van Buren.
Keith, B. H.	Sawyer	Berrien.
Keith, Bert W.	Winona Lake	Indiana.
Kellogg, Herbert	Ionia	Ionia.
Kempf, Geo. J.	Tecumseh	Lenawee.
Kennedy, Thos., Rural 3	Hesperia	Oceana.
Kennedy, Wm., Rural 3	Hesperia	Oceana.
Keppel, Thos.	Zeeland	Ottawa.
Kettle, Burt	Coopersville	Ottawa.
Kidd, J. H.	Ionia	Ionia.
Kingsley, H. J.	Fennville	Allegan.
Klien, F. J., Rural 1	Farmington	Wayne.
Knies, C. C.	Watervliet	Berrien.
Knight, David & Son	Sawyer	Berrien.
Kniseley, A. J.	Benton Harbor	Berrien.
Krebs, Geo. J.	Northport	Wayne.
Ladd, E. O.	Old Mission	Grand Traverse.
Lasch, A. A., Rural 2	Suttons Bay	Leelanau.
Lass, Peter H., Rural 1	Bear Lake	Manistee.
Lawrence, F. E.	Cressey	Barry.
Lawrence, L. L.	Decatur	Van Buren.
Leggett, E. E.	Fennville	Allegan.
Lindsley, Geo. W.	Harbor Springs	Emmet.

Name.	P. O. Address.	County.
Lincoln, L. C.	Greenville	Montcalm.
Lincoln, Mrs. L. C.	Greenville	Montcalm.
Loomis, P. B.	Jackson	Jackson.
Lord, E. G., Box 56 Rural.	Arcadia	Manistee.
Macaulay, T. B.	Montreal	Canada.
Magill, R. M., 159 LaSalle St.	Chicago	Illinois.
Maguire, H. W., 7116 Deyo St.	Jackson	Jackson.
Maguire, John.	Pontiac	Oakland.
Mann, Clyde Alison, Rand-McNally Bldg.	Chicago	Illinois.
Mann, S. B.	Glenwood	Florida.
Marshall, William A.	Old Mission	Grand Traverse.
Marshall, W. C., 128 So. Sacramento Blvd.	Chicago	Illinois.
Mason, L. M.	East Saginaw	Saginaw.
Mason, Mrs. Sarah A.	East Lansing	Saginaw.
Matheson, Frank, Rural 1.	Elberta	Benzie.
Mead, A. F., Rural 11.	Battle Creek	Calhoun.
Merritt, H. E., Rural 2.	South Haven	Van Buren.
Merritt, J. E.	Manistee	Manistee.
Messer, G. W.	Almont	Lapeer.
Methven, C. S.	Holland	Ottawa.
Miller, Chas. H.	Glen Arbor	Leelanau.
Miller, Frank A.	Northville	Wayne.
Miller, John T.	Birmingham	Oakland.
Mitchell, James.	Almont	Lapeer.
Monat, Lawrence, Jr., 1540 Hawthorne Terrace.	Berkeley	California.
Monroe, C. J.	South Haven	Van Buren.
Monroe, Mrs. Clara O.	South Haven	Van Buren.
Montague, A. K.	Traverse City	Grand Traverse.
Moore, Mrs. Samuel C.	Muskegon	Muskegon.
Moores, J. H.	Lansing	Ingham.
Morgan, Samuel M., 1301 Ashland Block.	Chicago	Illinois.
Morrow, R. E.	Central Lake	Antrim.
Morse, Miss Anna, Rural 1.	Old Mission	Grand Traverse.
Mullen, James.	Manistee	Manistee.
Munson, J. Pomeroy, Knapp Ave.	Grand Rapids	Kent.
Murray, James P., Rural 7.	Albion	Calhoun.
McCallum, Neil.	Hesperia	Oceana.
McClatchie, G. C.	Ludington	Mason.
McCutcheon, R. F.	Big Rapids	Mecosta.
McGuire, J. Fred, 101 Washington St.	Chicago	Illinois.
McHardy, A. J.	Almont	Lapeer.
McNaughton, Robert T.	Jackson	Jackson.
Nabors, Nellie S.	Flint	Genesee.
Neff, David.	Ravenna	Muskegon.
Neilsen, Henry L.	Ionia	Ionia.
Newhall, Benj., 131 South Water St.	Chicago	Illinois.
Newhall, John, 131 South Water St.	Chicago	Illinois.
Nichols, W. W., Geddes Ave.	Ann Arbor	Washtenaw.
Nicol, Jas., Braeside Fruit Farm.	South Haven	Van Buren.
Noble, W. A.	Monroe	Monroe.
O'Donald, R. H.	Howard City	Montcalm.
Olney, B. J.	Reeman	Newaygo.
Overton, F. J.	Bangor	Van Buren.
Overton, Miller.	Bangor	Van Buren.
Palmer, W. S.	Kalkaska	Kalkaska.
Palmer, Thomas W.	Detroit	Wayne.
Pancost, C. E., Rural 6.	Lansing	Ingham.
Partridge, Newton A., Room 53, No. 54 W. Randolph St.	Chicago	Illinois.
Partridge, Newton L., 611 W. Illinois St.	Urbana	Illinois.

Name.	P. O. Address.	County.
Pennell, Ray L., Box C.	Traverse City	Grand Traverse.
Perry, George L.	Mt. Pleasant	Isabella.
Perry, Jacob H.	Goodison	Oakland.
Petersen, J. M.	Manistee	Manistee.
Petty, Thos.	Spring Lake	Ottawa.
Pierce, Geo. W., Box 235	Harbor Beach	Huron.
Pierce, N. B.	Ludington	Mason.
Port, Geo. L.	Coloma	Berrien.
Post, L. J.	Lowell	Kent.
Pratt, C. A.	Benton Harbor	Berrien.
Pratt, W. M.	Benton Harbor	Berrien.
Prentiss, Judge Wm.	Bravo	Allegan.
Preston, Wm. F.	Fremont	Newaygo.
Prettyman, O. G., Rural 4	Scottville	Mason.
Pugsley, M. H.	Paw Paw	Ban Vuren.
Ramsdell, Dr. L. S.	Manistee	Manistee.
Ranney, D. D.	Leslie	Ingham.
Rasmussen, R. J., Box 416	Marlette	Sanilac.
Read, G. P., 119 Duane St.	New York	New York.
Reed, P. A.	Beulah	Benzie.
Reynolds, E. H.	Monroe	Monroe.
Reynolds, H. G.	Pasadena	California.
Richmond, E. D.	Pentwater	Oceana.
Ricker, Dr. John D.	Pontiac	Oakland.
Rider, Ralph, Rural 3.	Hart	Oceana.
Robbins, W. H., Rural 4	Bangor	Van Buren.
Robischung, H. B.	Cloverdale	Barry.
Robotham, Jay.	Beulah	Benzie.
Rockey, Clyde W.	St. Joseph	Berrien.
Rogers, A. J., Jr.	Beulah	Benzie.
Rogers Bros., Box 452.	Alpena	Alpena.
Rose, Paul.	South Frankfort	Benzie.
Rowe, Geo. E., R. F. D. 11	Grand Rapids	Kent.
Ruckmann, H. P., Star Route.	Hesperia	Oceana.
Russell, C. N.	Manistee	Manistee.
Russell, Edwin	Manistee	Manistee.
Russell, Dr. Geo. B.	Detroit	Wayne.
Russell, J. B.	Wheaton	Illinois.
Rust, C. E.	Ionia	Ionia.
Samuelson, Norman L., 1811 W. Madison	Chicago	Illinois.
Satterlee, James	Lansing	Ingham.
Scales, J. C. & C. R., So. Water St.	Chicago	Illinois.
Schenbeck, Edwin L., Rural 3.	Hesperia	Oceana.
Schreiber, Thor, Rural 2.	Fennville	Allegan.
Scott, Dr. Austin	New Brunswick	New Jersey.
Scott, Mrs. C. W.	Grand Rapids	Kalamazoo.
Scott, E. H.	Ann Arbor	Washtenaw.
Scudder, C. B.	Augusta	Kalamazoo.
Sessions, Charles A.	Mears	Oceana.
Sessions, Horace	Shelby	Oceana.
Sessions, William	Ionia	Ionia.
Sheffield, Wm. E. & Co.	Benton Harbor	Berrien.
Shepard, Leon, 13 Julia St.	Grand Rapids	Kent.
Sheridan, John	Hudsonville	Ottawa.
Sherk, Ralph, 151 Clinton St.	Grand Rapids	Kent.
Shirley, W. H., Rural 8.	Allegan	Allegan.
Simmons, F. P., Rural 1	Northville	Wayne.
Sisters of St. Joseph, Nazareth Academy.	Kalamazoo	Kalamazoo.
Skinner, Dr. E. P., Chicago Savings Bank Bldg.	Chicago	Illinois.
Sly, Miss Addie.	Birmingham	Oakland.

Name.	P. O. Address.	County.
Smeltzer, Joseph.	Elberta.	Benzie.
Smith, Henry, Cor. Monroe and Division.	Grand Rapids.	Kent.
Smith, E. T.	Ionia.	Ionia.
Smith, Howard B.	Winona.	Ontario.
Smith, H. H.	Jackson.	Jackson.
Smith, N. E.	Ionia.	Ionia.
Smythe, R. A.	Benton Harbor.	Berrien.
Snyder, Wm. E.	Hart.	Oceana.
Soule, J. B.	Fruitport.	Muskegon.
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